Implementation of Centre-level Food and Nutrition Policies: A Mixed-Methods Study of Child Care Centres in Alberta

by

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Abstract

Child care centres are important spaces for health promotion. Although child care centres have an important role in offering meals that include important nutrients that young children need for healthy growth and development and in supporting young children in developing healthy eating behaviours that can be carried into adulthood, food environments in child care are sub-optimal. Food and Nutrition Policies (FNP) have the potential to improve child care food environments, but evidence is still limited. The purpose of this sequential, mixed-methods study was to: i) perform a scoping review to identify theories, models and frameworks (TMFs) used to inform the implementation of healthy eating interventions in centre-based child care services in developed countries, ii) conduct a cross-sectional survey to describe resources and strategies in place to support FNP implementation in child care centres in Edmonton, Alberta, and iii) complete a theoretically-informed multiple case study to describe characteristics of the innovation, recipients, and context that influence the implementation of FNP among child care centres classified as low and high implementers. The scoping review identified 28 different TMFs targeting different socio-ecological levels across 38 studies. Majority of studies relied on individual-focused TMFs. Poor TMF selection, use and reporting were identified, particularly in the development of implementation strategies, which could limit TMF's utility. The cross-sectional survey included 43 (13% response rate) child care centres across the Edmonton metropolitan region. Almost all of the participating centres had FNP in place (94%). However, on average, only about 9 of the 17 resources and processes (range 1–17) required to support FNP implementation were well-established across centres. More often, policies lacked a description of goals and providers' responsibilities, centres did not secure resources for policy implementation and lacked evaluation of policy implementation. The multiple case study presented a comprehensive description of factors that might influence FNP implementation in child care centres. In terms of innovation, lack of clarity on FNP and a limited degree of fit were the main gaps to implementation. Also, providers had limited

nutrition knowledge and skills, had limited power and authority to enforce policy and reported a perception of low parents' commitment. In general, child care centres provided a supportive environment for FNP implementation, but mechanisms to embed and evaluate FNP implementation lacked focus on FNP. Overall, cases were influenced by external and system-level factors, such as regulatory frameworks, incentives and environmental stability. Access to inter-organizational networks varied across the different organizational structures (profit, non-profit, franchised). In conclusion, collaborations between researchers, policymakers, practitioners and families can help to build capacity for FNP implementation and to address the gaps identified.

Preface

This doctoral thesis is an original work by Marjorie Rafaela Lima do Vale. Three research studies were included as part of this thesis and where required, received research ethics approval from the University of Alberta Research Ethics Board (REB). The first study did not involve human subjects and ethics approval was not required. The second study, "Child care centres implementation survey," received ethics approval on May 22, 2018, from REB 1 (Pro00081965). The third study, "A case study of the Implementation of Food and Nutrition Policies (FNP) in child care centres," received ethics approval on February 12, 2019, from REB1 (Pro00087972).

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List of Abbreviations

AIM-P	Assess, Identify and Make it happen for Preschools
ANGCY	Alberta Nutrition Guidelines for Children · and Youth
BMI	Body Mass Index
CACFP	Child and Adult Care Food Program
CAFRA	Child Care Association For Resources to Administrators
CFIR	Consolidated Framework for Implementation Research
CINAHL	Cumulative Index of Nursing and Allied Health Literature
ECE	Early Childhood Education
EMBASE	Excerpta Medica dataBASE
ERIC	Education Resources Information Center
FNP	Food and Nutrition Polic
HBM	Health Belief Model
HDI	Human Development Index
IMA	Intervention Mapping Approach
INPC-S	Implementation of Nutrition Policies in Childcare Survey
INSPECT	Improvement Science Proposals Evaluation CriTeria
LOIn	Level of Institutionalization
MEDLINE	Medical Literature Analysis and Retrieval System Online
PARIHS	Promoting Action on Research Implementation in Health Services
PDCA	Plan, Do, Check and Assess
PRECEDE	Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation
PROCEED	Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development.

PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PsycINFO	Psychological Information Database
QAS	Questionnaire Appraisal System
RCT	Randomized Controlled Trials
RE-AIM	Reach, Effectiveness, Adoption, Implementation, and Maintenance
REDCAP	Research Electronic Data Capture
StaRI	Standards for Reporting Implementation Studies
T-CAST	Theory, Model, and Framework Comparison and Selection Tool (
TAM	Technology Acceptance Model
TDF	Theoretical Domains Framework
TMF	Theory, Model and Framework
TPB	Theory of Planned Behavior
USA	United States

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1 Introduction and Background

1.1 The impact of child care on children's diets, nutritional status and health

Healthy diets are essential for young (i.e., toddlers (1-3 years), preschoolers (3-5 years)) children's growth and development. Children's poor diets put them at greater risk for deficiencies in multiple nutrients [1]. Beyond that, healthy diets also set the stage for the establishment of healthy eating habits that have the potential to be carried into adult life [2,3], and help to prevent common chronic diseases later in life such as obesity, diabetes, cancer and cardiovascular diseases [4]. Therefore, healthy diets have both short- and long-term consequences on children's health.

Data from national surveys conducted across many developed countries showed that young children's diets are not meeting nutrient requirements. For example, in the United States (USA), infants and toddlers consumed high amounts of sodium and saturated fat and low amounts of potassium, fibre, vitamin D [5]. A review of national surveys across European countries showed a similar profile – in some countries children aged 1 - 5 years consumed excessive quantities of sodium and saturated fat and lower than recommended levels of fibre, iron, vitamin D, and folate [6]. In Australia, 5 to 11-year-old children consumed more free sugars, sodium, and saturated fat than is recommended for good health [7]. Also, data from the Canadian Community Health Survey conducted in 2004 showed that children aged 1- 8 years were not meeting recommendations for fibre, vitamin D, calcium, and sodium [8]. Altogether, those findings revealed that children are at risk for nutritional deficiencies, with some of them also at risk of other chronic conditions such as obesity, diabetes, hypertension, which indicate that improvements in children's diets are warranted.

Young children's diets are largely influenced by the types of foods made available to them and by the contexts and early experiences around eating [9,10]. Although influenced by innate characteristics, children can learn to accept and prefer new foods [11]. Acceptance of new foods

seems to be particularly sensitive to children's age, with younger children (2 – 6 years) being more readily influenced by factors, such as food availability and accessibility, parental modelling and feeding strategies (e.g., pressure or rewards) [10,12–14] than older children (7 – 11 years), emphasizing the importance of exposure to healthy food environments early in life.

Children's first experiences with new foods and eating occur in the context of the home [15]. In the home, parents or caregivers are not only responsible for selecting the foods, but they are also role models for children, and use feeding strategies that influence children's food consumption [10,16]. Existing reviews of children's feeding behaviours support a strong association between many aspects of the home food environment with children's diets, including types and amount of foods available and accessible and parent-child interaction during feeding, including modelling and feeding strategies used, such as pressure or rewards [9,10,15–21].

In developed countries, such as the United States, Canada, European countries, the United Kingdom, and Australia, a great number of parents now rely on child care [22–25] for an extensive number of hours per week [25–27]. The fact that children might spend most of their waking hours within child care environments may result in child care settings exerting greater influence on children's diets and nutritional status [28]. The term child care encompasses a variety of formal (i.e., care by child care providers) and informal (i.e., care by family members or relatives) child care arrangements. In Canada, child care formal arrangements include centre-based (i.e., care provided in a commercial space) and home-based arrangements (i.e., care provided in the home of the provider) [25].

Previous systematic reviews have explored the implications of different child care arrangements on childhood overweight and obesity [29,30]. It has been shown that centre-based arrangements have the potential to reduce the risk of overweight and obesity in children, yet this was not consistently found across studies [29,30]. The protective effect of centre-based child care against overweight/obesity was particularly relevant for children attending child care at 3 to 5

years of age, compared to those with earlier commencement, which might be related to the intensity of child care use [29,30]. In Canada, for example, the peak of child care use is at 4 years of age [25]. The majority of the evidence supporting the association between child care arrangements and children's nutritional status, however, comes from studies conducted in the United States, which might have little applicability to the Canadian context as the regulations and funding for child care programs are different.

Two population-level studies in Canada examining the association between type of child care arrangement and the risk of increased BMI showed mixed results. One study conducted in Canada from 1994 to 2003[31], which included data from a nationally representative sample of children (n=3916), found no associations between attendance to centre-based child care for at least 10 hours per week at age 2 to 3 years and changes in BMI at 6 to 7 years when compared to parental care. Notably, attending home-based child care (i.e., care by relatives and non-relatives) at 2 to 3 years was associated with an increased BMI percentile at 6 to 7 years. For girls, there was an interaction between adequacy of the household income measured at age 2 to 3 years and BMI increase at 6 to 7 years, which was not further explained [31]. However, different findings were reported in another study conducted with a large sample of children (n=1649) in Québec from 1997 to 2007[32]. In this study, children who attended centre-based child care as the main arrangement (most hours of child care use and children from 1.5 to 5 years of age) had increased chances of being overweight or obese at 4 to 10 years, when compared to parental care. The rate of overweight/obesity increased significantly with age and child care use (e.g., for every 5 hours spent in centre-based child care from 1.5 to 4 years, the odds of being overweight/obese at 4 to 10 years increased by 9%). There were no differences based on families' socioeconomic status (socioeconomic index measured at baseline - 5 months) [32]. The differences in the way variables were used and analyzed, and an array of contextual factors make comparisons across studies difficult. For instance, there are differences in the operationalization of the variables, such as the child's age when first exposed to child care and the amount of child

care used (intensity of exposure). Whereas McLaren and others compared the use of child care at 2 to 3 years for greater than 10 hours/week, the Québec study included the main arrangement of child care used from 1.5 to 5 years of age. Also, the variations in the child care contexts across the provinces may be an underlying factor contributing to discrepancies in the results. There is no universal regulation or funding for child care settings in Canada and it is likely that differences observed are related to variations in regulations, fees and use across provinces – Québec has a unique low-fee universal child care program, for example. It is important to note that establishing a strong causal evidence base linking the type child care arrangements to children's nutritional outcomes, specifically children's weight, is particularly difficult considering that there are other important factors that impact children's eating behaviours, diet and nutritional outcomes (e.g., foods available at home, feeding practices, physical activity, sociodemographic factors, and others)[33]. Considering that there is substantial heterogeneity in the potential effect of child care arrangements on children's nutritional outcomes, more research is still needed that assesses additional variables that might be responsible for the noncomparability[34] (e.g., food environments in child care).

Additional studies have explored whether there was a more proximal relationship between different child care arrangements and children's nutritional status. A recent systematic review showed that although the majority of the associations between child care arrangements and children's diets were null, some studies reported superior diet quality among children attending centre-based child care [35]. For example, one study in the USA showed that children who attended primarily Head Start centres (a sub-type of child care program directed for low-income children) at age 3, had higher scores in healthy eating habits (frequency of weekly intake of milk, 100% fruit juice, vegetables, and fruits) at ages 4 and 5 compared to those attending other types of centre-based care (an increase of 2.35 times per week) and not centre-based care from someone other than the parents (an increase of 2.74 times per week) [36]. While another study also conducted in the USA found that children attending centre-based care as a primary

arrangement at age 4, consumed less soda (16.2%) and more fruits (71.9%) compared to children attending other types of non-parental care [37]. Ultimately, one study in France, found that 2-year-old toddlers cared for at home by someone other than the mother, showed a more processed, fast-foods dietary pattern at age 2, 3, and 5, when compared to others attending centre-based or cared for by the mother [38]. To date, no Canadian studies have been published that explored the relationship between different arrangements and children's diets.

Considering the scarcity and inconsistency in the current evidence available, it can be difficult to build a case for the importance of creating and supporting healthy food environments in child care settings, particularly in Canada. To draw more clear conclusions about the role that child care settings play on children's diet and health, future studies should avoid combining different child care arrangements into wider categories, which constrains comparison between studies and reduces the ability to conduct a meta-analysis. Further, it would be important to account for the cumulative effect exerted by the home environments. For instance, in a qualitative study conducted in Ontario, child care providers reported that parents discouraged children from eating disliked foods, such as vegetables offered at child care centres [39]. Corroborating that, one survey conducted with 161 parent-staff-children in the Netherlands showed that discrepancies in parents' and providers' feeding practices resulted in unhealthy children's intake [40]. And more importantly, future research should better articulate hypothesized relationships and account for the several mediators that might link child care arrangements to children's diet and nutritional status. For instance, figure 1.1 outlines how child care arrangements might impact children's nutritional status through the food environments that are provided, as suggested in the systematic reviews that were presented in this chapter [29,30]. The aspects of the child care food environments that might influence children's nutritional status will be further described.

1.2 The quality of child care food environments

Many aspects of the child care food environment might influence children's diets and nutritional status. Studies have shown that providing healthy foods [41,42] and nutrition education [43] to children attending child care results in children's increased preference and intake of healthy foods. In addition to that, educators' practices during mealtime such as providing positive verbal reinforcement, using non-food rewards, encouraging children to 'try one more bite', allowing children to self-select food [44] and endorsing healthy foods [44,45] also stimulates children's consumption of healthy foods.

Ensuring that child care settings are providing healthy foods and opportunities for children to develop healthy behaviours from early ages is crucial. However, many studies show that there is room for improvement in the child care food environment, which includes the nutritional quality and adequacy of the menus provided, aspects of the meal services, and the interaction between the child care educators and children around food. Studies in the USA have shown that inadequate amounts of carbohydrates, fat, fibre, folate, calcium, iron, vitamin D and E and sodium were being provided in child care menus [46], that interactions between children and child care providers around food were suboptimal [47], and that the provision of nutrition education was also limited [48–52]. Similarly, none of the sampled child care centres in Hunter New England, Australia were meeting recommendations set by dietary guidelines in terms of vegetables, and only about 40 to 60% were meeting recommendations for meat [53].

Although limited, studies in Canada have also shown that the quality of meals in the child care setting was not meeting nutrient requirements or guidelines. In Nova Scotia, a survey of 35 randomly selected child care centres showed that menus were not providing sufficient calcium, iron, folate, fibre, vitamin D and E, and foods such as processed meats, including hot dogs, fish cakes/sticks, and chicken nuggets were frequently used [54]. In Québec , of the 33 child care centres selected by convenience, only 25% met Canada's Food Guide food group

recommendations for snacks, 50% for foods low in sodium and 56% for foods low in sugar [55]. In a sample of 19 child care facilities (centre and home-based) randomly surveyed in Ontario, portions of vegetables, protein and grains were below recommendations. Moreover, portions of foods high-fat and/or high-sugar foods (e.g., cookies, candies, sweetened cereal) were above recommendations [51]. In New Brunswick and Saskatchewan, all of the 61 urban and rural child care centres randomly selected served lunches that did not meet provincial recommendations for all food groups, except grains [56].

Existing evidence also suggests that Canadian child care centres are failing to meet best practice recommendations in terms of educators' behaviours. In Alberta, a case study of three child care centres revealed that child care educators practiced feeding strategies that exerted extensive external control over children's intake [57], which are explicitly discouraged by provincial nutrition guidelines – the Alberta Nutrition Guidelines for Children and Youth (ANGCY) for the child care setting [58]. In Ontario, a survey with 19 centres showed that in half of centres, educators did not consume the same food as children [51], which contradicts a recommended best practice for child care educators [59]. Additionally, the same study showed that most (89%) of the 19 surveyed child care programs did not have a nutrition curriculum[34].

Current evidence in Canada is informed by studies that included small samples and had low response rates, which might provide only partial or biased descriptions of the broader scenario. Although current evidence suggests that there are aspects of the food environments provided in Canadian child care settings that need to be improved, particularly in terms of the nutritional content of the foods provided, there are other aspects of the food environments in Canadian child care that remains largely unknown (e.g., educator's mealtime practices and nutrition education opportunities provided to children). As such, future descriptive studies could attempt to address this gap. Understanding child care food environments in terms of foods provided, mealtime practices, and nutrition education might support better estimates

regarding the impact of child care attendance on children's diets and nutritional outcomes, as described in figure 1.1. The next section will explore the role that government and nutrition policies, resources, and support might have in improving child care food environments.

1.3 The role of food and nutrition policies in child care food environments

1.3.1 Government enacted food and nutrition policies

At the government level, Food and Nutrition Policies (FNP) have been defined as a "strategy for improving the nutritional status of the population while being compatible with their social, economic and cultural priorities" [60]. FNP aim to influence production, processing, distribution of foods [61], as well as places where individuals live, learn or work, such as child care, recreational facilities, schools, and worksites, which are all common targets of FNP [62].

FNP targeting child care settings are becoming popular in developed countries[63,64]. Examples of government enacted policies influencing child care include laws that allocate funding for nutrition-related interventions in child care (e.g., B20-407 Act, which allocate local funding to support nutritional standards and nutrition education programs in child care settings in Washington, USA) [65] or licensing acts and regulations (e.g., Alberta Child care Licensing Act) [66] that establish minimum requirements for meals provided and voluntary nutrition guidelines (e.g., Alberta Nutrition Guideline for Children and Youth) [58]. In Canada, although each province has nutrition policies, they are not always mandatory, as in Alberta.

Existing evidence suggests that government enacted policies might be effective in creating healthy food environments in child care. One of the examples was a study conducted in Connecticut, where new state licensing regulations require all licensed child care centers serving meals/snacks to follow Child and Adult Care Food Program (CACFP) nutrition standards, despite CACFP participation. The results showed that 3 out of 4 CACFP centres (n=87), complied with more than 90% of requirements evaluated. Whereas 3 out 4 non-CACFP (n=256) complied with about 60% of the CACFP requirements [67]. In addition to that, further studies also

showed that provision of higher reimbursement rates for food expenditure improved menus (more whole grains and fresh products, lower energy density, and higher nutrient adequacy of menus overall) provided by 60 family day homes participating in the CAFCP [68]. Another initiative evaluated in the USA was the impact of the ABC Child Care Program standards on the foods and practices of child care programs. A survey with 64 child care centres in South and North Carolina found that the establishment of new mandatory standards resulted in improvements in educators' practices (e.g., prohibit using food as punishment), but not in the other aspects evaluated [69].

While the use of mandatory policies has shown some promising results on some aspects of child care environments, the influence of voluntary policies or guidelines alone might be less effective. One study conducted with 257 child care services in New Zealand (30.3% response rate) showed that only three out of 57 centres that provided menus for analysis had menus that met all the criteria set in government guidelines [70]. In addition to that, a survey conducted with 674 child care facilities in Alberta (an 81% response rate) showed that after one year of the release of the Alberta Nutrition Guidelines for Children and Youth (ANGCY), about 65% of child care programs were aware of the ANGCY, and about a half of those were using the guidelines, although the extent to which the guidelines were used was not reported [71].

As the development of guidelines did not necessarily lead to changes in child care practice, interventions to catalyze the uptake of guidelines have been proposed and tested, including the impact of accreditation systems, and awards schemes. Studies have shown positive correlations between accreditation requirements and child care practices, which suggest that the inclusion of guidelines as part of accreditation requirements might be an effective strategy to improve uptake. For instance, a cross-sectional survey with 38 centres in the USA showed a significant association between practices regarding water availability in child care and accreditation standards [72]. One study in Alberta, found positive short-term changes in children's

physical activity after the release of new accreditation requirements, yet improvements were not observed consistently across all age groups [73]. In addition to that, award schemes have also shown promising results. For example, a survey conducted in New Zealand showed that child care programs participating in the Heart Foundation's Healthy Heart Award presented higher scores in terms of menu compliance with national guidelines [70], compared to non-participating centres. Also, one intervention study of 20 child care centres in Australia showed that a nutrition award scheme, which included training and technical support, improved short-term compliance with guidelines in terms of food groups served, where baseline compliance rate increased from 22-50% to 90% at follow-up [74].

Previous studies show that government enacted policies are promising in creating healthy environments in child care, however, literature also shows that some policies are easier to implement than others [75], and that there are child care programs that are not able to meet even the more basic policies [76]. As such, the potential adverse effects of policies should be considered in policy-making. For example, one qualitative study in the USA found that child care programs without the resources to comply with rigid mandatory regulations in terms of food handling opted to provide highly processed snacks over home-made alternatives [75]. The potential of policies in increasing inequalities across child cares should be carefully considered to avoid that only child care programs that already have the resources and capabilities will comply or adopt such policies or systems [77].

Current evidence, although suggestive of the effectiveness of mandatory government policies over voluntary alternatives in creating healthy food environments in child care settings, still leave many questions unanswered, particularly in the Canadian context, where evidence is still scarce. Thus far, studies suggest that government enacted policies can bring about change in child care centres, but policies are disproportionally adopted and implemented by child care centres. Differences in adoption and implementation might be explained by different factors.

For instance, Sharma and colleagues[78] proposed a model for organizational readiness to change that highlights several desirable factors to be considered to increase the odds of successful implementation of nutrition programs in early childhood and education settings. The model reinforces how organizational financial, infrastructure, and human resources are necessary for implementing changes related to nutrition. But also describes that professional growth and training, as well as administrative policies that set clear behavioural objectives and that are aligned with government enacted policies might be needed if a successful implementation is to be achieved. As such, developing a better understanding of the impact of government enacted policies on child care environments and practices might also be required to understand the differences in system-level resources and support, as well as differences in child care level policies and contexts that might contribute to FNP adoption and implementation, as suggested in figure 1.1.

1.3.2 Service level food and nutrition policies

In the Early Learning and Child Care setting, which includes child care, service level or administrative FNP have been conceptualized as "the set of written and adopted principles that aims to fulfil the nutritional needs of children by ensuring availability and accessibility of healthy foods" [64]. Surveys of child care centres have indicated that 58% of services in Hunter New England, Australia [79], 66% of child care centres in Dublin, Ireland [80], 82.4% of centres in Auckland, Counties Manukau and Waikato, New Zealand [76] had established their own FNP. In Canada, 63% of centres in London, Ontario [51] and about 77% of child care programs in Alberta reported following a written nutrition policy [81]. The popularity of administrative policies might reflect recommendations [58,82] and regulations [83] calling for administrative FNP.

Administrative FNP are expected to assist child care centres in developing and implementing practices that are informed and consistent with regulations and standards in place [76,84]. As such, improving administrative FNP are often targeted in studies aiming to

improve child care food environments [85–92]. However, recent studies suggest that administrative policies are not meeting such goals, as policies are not reflective of national and international guidelines for child feeding [76,84]. In addition to that, a study on the beverages served at child care centres in Connecticut found no association between the centre's policies and observed practices [72]. A study in North Carolina found only a weak relationship between the centres' policies and providers' consumption of unhealthy foods, role modelling and having nutrition talks at meals [93]. Similar results were observed in preschools in Ireland where the existence of administrative FNP in the child cares did not guide providers practices [80]. Altogether, studies suggest that there is a disconnect between administrative policies and best practices. As such, the role of administrative or service level policies, which are thought to help to translate government-enacted policies to child care practices, is another area that deserves further consideration.

Understanding the gaps in the implementation of FNP is still an emergent area. Existing theories, models, and frameworks (TMFs) used in dissemination and implementation research provide useful structures to organize implementation factors and/or explain implementation success or challenges [94]. Thus, this literature review concludes by discussing the utility of TMFs to explore FNP implementation in the child care setting.

1.3.3 Child care food and nutrition policies in Alberta

Each province or territory in Canada has its own set of legislated requirements and regulations for child care [95]. In Alberta, three main provincial documents guide child care in terms of the food provided and interactions around food and eating in child care, including the *Child care Licensing Act* [66], *Accreditation Standards for Child Care*[96], and the Alberta Nutrition Guidelines for Children and Youth[58].

The Licensing Act sets requirements for all licensed programs in the province. All child care programs in Alberta must hold a license to operate [66], with child care programs being defined as centre-based and home-based programs that provide care to seven or more children.

The Licensing Act states that licensed child care programs must "provide or require parents to provide meals and snacks following a food guide recognized by Health Canada," and to "feed children in manners that are appropriate to their age and level of development." Also, a "Day Care Program Plan Template" orient child care programs applying for a license to include the requirements for food and nutrition as part of their administrative policies and procedures. All licensed child care programs are inspected at least two times during a 12-month-period [66], yet this information hasn't been consolidated or made publicly available.

Beyond licensing requirements, child care programs can voluntarily apply to become accredited programs. Accreditation means that programs meet standards of excellence above the provincial licensing requirements [96]. Other than "Respect children's dietary requirements for individual and cultural needs"[96], food and nutrition are not addressed in detail in the Alberta Child Care Accreditation Standards. Accredited programs must submit annual reports and are re-evaluated every 3 years [96]. Information describing where child care programs are in terms of accreditation requirements is also not publicly available.

Lastly, there is the ANGCY, a set of voluntary guidelines that provide more detailed guidance for child care programs. Beyond other things, the ANGCY provides recommendations for administrative FNP development, implementation, and evaluation. The ANGCY were distributed in print and electronic formats to child care centres in 2008 [97], and are currently available only in electronic format. While the uptake of the ANGCY was not evaluated by the province, a survey (n=488) conducted in 2009 by a research group at the University of Alberta showed that about 65% of child care programs were aware of the ANGCY [71], but adherence to ANGCY is not monitored [81]

In Canada, there are little data available regarding FNP in child care programs and the scenario in Alberta is not any different. Given the important role that child care plays in shaping children's diets and nutrition outcomes and the potential benefit of FNP in creating healthy food

environments in child care settings, a better understanding of the implementation and impact of FNP in place is warranted.

1.4 The role of theories, models, and frameworks in exploring influential factors for food and nutrition policy implementation in child care

Theoretical approaches used in dissemination and implementation research are classified as theories, models, and frameworks. In a simple and purpose-oriented way of looking at them, theories aim to predict and explain implementation outcomes, frameworks aim to describe and organize implementation factors and models aim to guide implementation processes[94].

Theories, Models, and Frameworks (TMFs) can be used to inform many aspects of implementation efforts, including the steps to be followed throughout the implementation, the design of strategies to promote change, and the selection of outcomes that determine implementation success [94,98,99]. Often, TMFs are used to identify barriers and facilitators to implementation [100]. The added benefit of using TMFs to guide the exploration of barriers and facilitators to implementation in the child care setting have been attributed to TMFs inclusion of a broad range of implementation factors [101] theorized to be associated with implementation [79]. Using TMFs ensure that relevant factors are not missed [101].

In the child care setting, a few studies have used TMFs to assess barriers and facilitators to the implementation of FNP both at pre-implementation and post-implementation stages. At the pre-implementation stage, one study conducted with child care centres in Australia[102], used the Consolidated Framework for Implementation Research [98], to develop tailored strategies (audit and facilitated feedback) to increase implementation of healthy eating and physical activity policies and practices. The Consolidated Framework for Implementation Research is an extensively used framework [99] that describes factors related to the intervention, individuals, processes, and inner and outer-setting that influence implementation processes [98]. Similarly, the Theoretical Domains Framework, which describes factors across 14 domains originated from

33 behaviour change theories [103], was also used in another study. The barriers for implementation were matched to the strategies used (e.g., securing executive support, provision of providers training, provision of resources, audit and feedback, implementation support) to improve the implementation of a dietary guideline in Australia[104].

More frequently, TMFs have been used at the post-implementation stage. For example, cross-sectional surveys assessed factors related to the implementation of healthy eating and physical activity policies and practices in Australian child care centres [79] using the Consolidated Framework for Implementation Research (CFIR). Four of the 13 framework's factors assessed were independently associated with full implementation, including policies and practices being a priority, considered easy, and supported by the management and parents. Another survey was conducted with child care centres in Australia, informed by the Theoretical Domains Framework [105]. Out of the 14 domains assessed, only increased "skills" correlated with the implementation of the dietary guidelines. A recent systematic review guided by the Theoretical Domains Framework identified barriers and facilitators to the implementation of dietary guidelines across 12 out of the 14 framework domains. Both quantitative and qualitative findings were considered in the review [101]. Ultimately, a multiple case study with two urban child care centres identified as 'early adopters' was conducted in Canada [97,106]. The interview guide was based on key constructs from the Diffusion of Innovations Theory [107]. The qualitative study showed that many organizational processes supported the voluntary early adoption of nutrition guidelines, including the existence of knowledge brokers and health champions, providers' trust in and support, feedback and recognition from leadership, supportive environments, and open communication processes.

Although the interest in exploring barriers and facilitators to the implementation of FNP with the aid of TMFs used in implementation science grew substantially in the recent 5 years, there are still areas for improvement. The majority of previous studies relied on cross-sectional

surveys. Albeit using a survey design can be an easy and convenient strategy to assess barriers and facilitators to implementation, they only provide "snap-shots" of the entire implementation process, and fail to account for the "moving picture" of the behaviour change process[107] in which implementation factors often interact in complex and unpredictable ways [108]. Also, surveys often rely on the data provided by one individual, who are assumed to be representative of the entire organization, which might not always be the case [107]. There is also the issue of social desirability bias [105]. In the face of these limitations, qualitative studies with data from multiple respondents have been proposed as a reasonable alternative to gain in-depth knowledge of implementation constrains[107], but have not often been conducted.

In addition, each theoretical approach provides a unique way of looking at the implementation process. For example, the TDF is focused on the individual motivations for behaviour change, the CFIR targets influential factors across multiple levels and the DoI on the characteristics of innovations and "early adopters" organizations. Theoretical approaches used in past studies in the child care setting represent only a few of the many theoretical approaches published. Exploring implementation in the child care through the lenses of a novel theoretical approach might provide new insightful perspectives, and draw attention to aspects that may have been neglected in previous studies [99].

1.5 The Promoting Action on Research Implementation in Health Services framework (PARIHS)

The Promoting Action on Research Implementation in Health Services framework was developed in 1998 [109]. PARIHS started as a compilation of authors' experiences on health services research. Over the years, PARIHS evolved, informed by reviews of the literature and empirical testing [110]. In its current version, published in 2015 [111], authors explicitly referred to theories of innovation, behavioural and organisational change and improvement that influenced the re-conceptualization of the framework [112].

The PARIHS's initial proposal was that successful implementation was more likely to happen if there was rigorous and robust research supporting the practice to be implemented, supportive and receptive contexts for implementation, and well-prepared and flexible facilitators to conduct the implementation process. After critiques and theoretical revisions, many changes to the original proposal were made, including: the concept of evidence was expanded to include innovations informed by both explicit and tacit knowledge, the recipient construct was included to reflect the influence of users of the innovation, and the context was expanded to encompass organizations inner and outer contexts [112]. Table 1 presents the current domains and sub-elements of the PARIHS framework.

Beyond focusing on implementation (versus adoption) and encompassing broad contextual factors [99], compared to other frameworks, PARIHS focuses on the facilitation process, which includes individuals acting as facilitators and using facilitation strategies [112], which seems particularly relevant in the context of child care settings, as previous studies have highlighted. PARIHS is also a well-cited framework [113] that has been applied in health research across different health settings [110] and recently in the child care setting [114,115].

Compatible with authors of the PARIHS recommendations [116], we intend to use PARIHS to produce diagnostics of current implementations contexts and facilitation efforts across child care programs, to guide future government interventions.

1.6 Summary

This literature review started with a discussion of the important role that child care plays not only in ensuring that young children get the nutrients they need for healthy growth and development, but also their potential to influence eating behaviours that are carried into adulthood. Evidence was presented showing that food environments in child care are sub-optimal, cautioning the reader that what is known about child care food environments in Canada is based on a limited number of studies with small samples. Moving further with the

discussion, the different types of policies that have the potential to influence child care food environments were presented. Although promising, there is still limited evidence supporting the effectiveness of such policies in changing practices in child care and children's outcomes, with negligible evidence attempting to explore in-depth why this might be the case, particularly in terms of administrative FNP. Figure 1.1 was developed considering the main points discussed in this review and illustrated important relationships to be considered in future studies in this area. Finally, the added value of employing theoretical approaches used in implementation research to guide the exploration of the issues in FNP implementation was discussed, yet TMFs remain barely used in the child care setting. Considering the scarcity of studies attempting to clarify the roles of FNP, and unveiling the many aspects constraining their implementation, this study will provide unique insights to guide policies, research, and practices in child care.

Table 1.1 Characteristics of the innovation, recipients, and context to be considered within the i-PARIHS framework

Innovation	Recipients	Context
Underlying knowledge sources	Motivation	Local level:
Clarity	Values and beliefs	Formal and informal leadership support
Degree of fit with existing practice and values	Goals	Culture
(compatibility or contestability)	Skills and knowledge	Past experience of innovation and change
Usability	Time, resources, support	Mechanisms for embedding change
Relative advantage	Local opinion leaders	Evaluation and feedback processes
Trialability	Collaboration and teamwork	Learning environment
Observable results	Existing networks	Organisational level:
	Power and authority	Organisational priorities
	Presence of boundaries	Senior leadership and management support
		Culture
		Structure and systems
		History of innovation and change
		Absorptive capacity
		Learning networks
		External health system level:
		Policy drivers and priorities
		Incentives and mandates
		Regulatory frameworks
		Environmental (in)stability
		Inter-organisational networks and relationships

Source: Harvey and Kitson (2016). Permission not required.

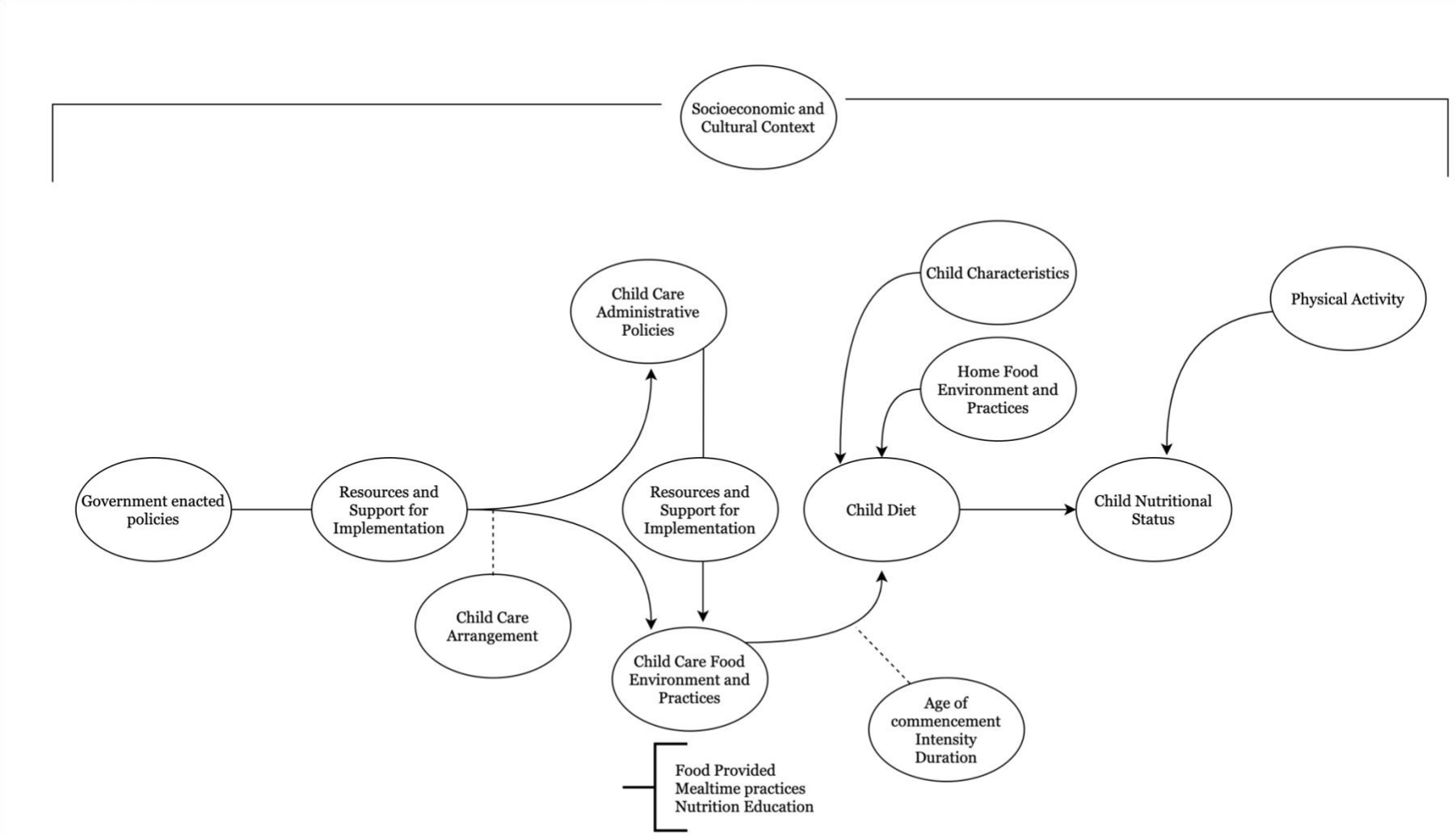

Figure 1.1 Suggested relationship between Food and Nutrition Policies and children's nutritional status.

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2 Purpose and Objectives

2.1 Purpose of the research and overview of the research design

This thesis aimed to address the gap mentioned in the literature review regarding the limited exploration of administrative FNP implementation in child care centres. Considering the recommendations provided in chapter 1, creating a better understanding of FNP implementation would benefit from the use of i) theoretical frameworks used in implementation science, and ii) qualitative research approaches. This ultimately guided the decision to conduct a sequential, mixed-methods design [1] resulting in three studies: a Scoping Review, a cross-sectional survey, and a multiple case study. The Scoping Review of the literature on the theories, models and frameworks used in the implementation of healthy eating interventions in the child care setting provided a comprehensive picture of approaches used to date and helped to identify which theoretical approach would better fit the purpose of this research. Considering that FNP implementation status among child care centres in Alberta was unknown, the cross-sectional survey was used to describe the implementation of FNP across child care centres in Alberta, and determine the level of FNP implementation that was needed. The results of the cross-sectional survey were used to identify centres with low and high implementation scores that were invited to participate in a multiple case study design. The multiple case study was guided by the PARIHS framework, which is one of the approaches identified in the Scoping Review. The selection of the PARIHS was informed by a mapping exercise (matching PARIHS elements to factors mentioned in previous studies). Moreover, PARIHS also provided a set of guiding questions that were useful to multiple case study. The data collected at the first and second stages informed the third stage of this sequential mixed-methods design and ultimately the sequencing of the three studies. Additionally, the findings from the different stages were integrated into the overall discussion of this thesis. This thesis addressed previous gaps regarding administrative FNP implementation by employing complementary quantitative and qualitative approaches, which provided both description of FNP implementation status in

Edmonton metropolitan region, Alberta, and an in-depth theoretically informed exploration of the factors related to the differences in implementation status.

2.2 Research objectives

The objectives of study 1 (Implementation of Healthy Eating Interventions in Centre-Based Child Care: A Scoping Review of the selection, application, and reporting of theories, models and frameworks [TMFs]) were to:

- identify TMFs used to inform the implementation of healthy eating interventions in centre-based child care services in developed countries;
- describe the selection, use, and reporting of TMFs; and
- describe limitations in the use of TMFs as identified by study authors and recommendations provided.

The objectives of study 2 (Are there gaps in nutrition policy development and implementation in child care centres in Alberta? A cross-sectional, provincial survey) were to:

- describe existing nutrition policies in child care centres in Edmonton metropolitan region, Alberta;
- describe the resources and strategies in place to support policy implementation; and
- explore the association between nutrition policy implementation and child care administrators and centres characteristics.

The objectives of study 3 (Factors and processes affecting the implementation of administrative Food and Nutrition Policies [FNP] in child care centres: a multiple case study) were to:

- describe characteristics of the innovation, recipients, and context that influence the implementation of administrative food and nutrition policies; and

- describe variations in the characteristics of the innovation, recipients, and context among child care centres classified as low and high implementers.

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3.1 Introduction

Poor eating behaviours during early childhood can compromise children's growth and development[1] and might increase their risk of developing obesity and nutrition-related chronic diseases[2]. Eating behaviours are shaped during the early years and lay the foundation for eating behaviours in adulthood [3]. As such, promoting healthy eating behaviours in children is a priority in developed countries[1].

Children's eating behaviours are influenced by a variety of factors, including the characteristics of the food environment in which children live [4,5]. With more families than ever before using child care services [6], many children spend most of their waking hours in care outside of the home where they may consume up to two-thirds of their daily energy requirements [7]. As such, children's eating behaviours are influenced not only by the family's food environments but also by the food environments that exist within child care settings [8]. Child care settings encompass different arrangements that provide care to children, including home-based (e.g., family day home, family daycare, home child care) and centre-based (e.g., child care centre, daycare program, nurseries, and preschool) [9].

Studies on the quality of food environments in centre-based child care show that they do not support children's healthy eating behaviours. For instance, many menus in child care centres did not meet the dietary recommendations for vegetables, fruits, grains, and dairy set by nutritional guidelines [10]. They were also low in carbohydrates, fat, dietary fibre, folate, calcium, iron, vitamin D and E, and included an excessive amount of salt [11–13]. Evidence also suggests that the interactions between children and child care staff have room for improvement. For example,

an observational study involving 30 USA-based child care centres, showed that most centres did not serve family-style lunches (88%), which involves staff sitting with children for most of the lunch (71%), and gave seconds to children that had not asked for it (63%)[14]. Given that food environments in child care centres can influence children's eating behaviours [8], effective interventions are needed to improve the quality of these environments to optimize children's relationship with food, nutritional status, growth, and development.

Child care centres across developed countries face a multitude of barriers at different levels in providing healthy foods to children. A review of the literature showed barriers exist at three socio-ecological levels: individual (i.e., knowledge, attitudes and beliefs, self-efficacy, convenience, interactions with parents/children), community (i.e., availability, price, and quality of food; connections with other providers and communities support), and societal (i.e., nutritional information resources and societal rules), all of which can affect food and mealtime decisions in child care centres [15]. Child care centres need guidance on ways and resources to overcome such barriers to creating healthy food environments.

While it is not feasible to address all factors perceived to affect child care centres' food environments in one implementation effort (i.e., putting an intervention into use), being mindful of challenges can facilitate the development of strategies designed to address known barriers to practice [16]. Researchers and practitioners working in the child care domain can benefited from using existing implementation theories, models, and frameworks (TMF) that have been utilized in other settings to inform tailored implementation strategies [17]. Also, the use of such approaches can help enhance our understanding of the role of identified facilitators/barriers in implementation outcomes [18]. The benefits of theoretically-informed implementation strategies can only be realized if approaches are used in appropriate and thoughtful ways [19].

A recent systematic review of strategies used to improve the implementation of healthy eating policies and practices in child care centres identified that only a minority of studies

developed implementation strategies with the aid of a TMF [20]. Also, only a handful of studies reported a rationale for selecting TMFs and a description of the application of such approaches. As the review was limited to studies with a parallel control group (i.e., randomized, including cluster-randomized, or non-randomized trials), it provided only a partial understanding of the use of TMFs in centre-based child care.

3.2 Objectives

Therefore, a gap exists in our understanding of the application and use of TMFs in interventions in child care centres. The purpose of this scoping review was to identify the types of TMFs across more diverse study designs and gather details on the application of these approaches in the implementation of healthy eating interventions in child care centres, to conduct a more complete assessment of the literature in this area.

3.3 Methods

This scoping review utilized the methodological steps proposed by Arksey and O'Malley[21] and by Levac, Colquhoun, and O'Brien[22] and was conducted from August 2017 to January 2019. The optional consultation stage to verify the findings was not conducted.

The term TMFs in this review refers to different theories, models, and frameworks used in implementation studies, including classic or implementation theories, process models, and determinant or evaluation frameworks [18]. Second, our scoping review questions and search strategy were limited to centre-based child care settings.

Five research questions guided this scoping review:

1) What TMFs were used to inform the implementation of healthy eating interventions in centre-based child care services in developed countries?
2) What criteria were used to select the TMFs?
3) How were TMFs used?
4) How were TMFs reported?

5) What were the limitations in the use of TMFs as identified by study authors and what were their recommendations?

Data sources

A two-stage search strategy was developed with the assistance of a research librarian (JT). An initial search, conducted on Medline, was employed to develop and refine keywords and index terms representing concepts such as (child care or daycare) AND (food or nutrition) AND (programs or models) (See Appendix A for complete search strategy). A second search was undertaken across Medline, Embase, CINAHL, ERIC, PsycINFO, Scopus, CAB Abstracts, Agricola, ProQuest Thesis and Theses, Prospero, and Cochrane library of SR. The Boolean operator NOT was used to exclude countries whose Human Development Index (HDI) was less than 0.8 [23] as the applicability of implementation studies from lower and middle-income countries is unknown [24].

In addition to the database search, subject matter experts were consulted. For the consultation with experts, authors of known relevant papers (n=51) were emailed the objectives and scope of the study and asked to provide relevant references. Finally, a hand search of the reference lists of included studies and those identified in systematic reviews was also conducted. The initial search was conducted in August 2017 and updated in October 2018. The Preferred Reporting Items for Scoping Reviews (PRISMA-ScR) criteria informed the reporting of the results (Figure 3.1) [25].

Inclusion and Exclusion criteria

All references identified were exported to RefWorks (https://refworks.com), an online bibliographic management tool. Relevant articles were retained using a two-level screening process. For the first level, only the title and abstracts were reviewed; for the second level, the full texts of articles were reviewed.

The first level of the screening process was conducted in two stages. The first stage was over-inclusive to ensure that important information was retained. After the completion of the

first stage, the research team met to discuss challenges and refine the inclusion/exclusion criteria (Table 3.1). After discussion, studies were excluded if they: targeted settings other than child care centres, were published before 1990 (as 96% of available implementation models and frameworks were published after 1990), as well as books, reports, and magazine articles (due to low retention and lack of methodological standards). Decisions regarding the inclusion/exclusion criteria were agreed upon by the research team.

For both stages of the first level screening, reviewers (MV and NB) were trained and completed a calibration exercise to increase inclusion/exclusion criteria reliability. Inter-rater agreement was calculated using percent agreement (>80%) on a sample of 30 articles sorted by identification number [26]. The remaining references were screened after sufficient agreement was achieved. The full-text screening was completed by the first author (MV) and supervised by a second reviewer (AF), which is considered an efficient method similar to double screening [27]. The reasons for excluding studies and uncertainties were recorded and coded. All disagreements were resolved by discussion between MV and AF.

Data extraction

Data were extracted by the first author (MV) and verified by a second reviewer (AF). Extraction forms were developed to meet the purposes of this study and were used, where applicable, to collect information related to authors, year, design, location, setting, objectives, population, intervention, strategies (dissemination or implementation, defined as strategies that distribute information and materials to the public and strategies that integrate evidence-based health interventions and change practice, respectively) [28], measured outcomes, reported outcomes, theoretical approaches utility and use, limitations and recommendations. The methodological quality of each of the included studies was not appraised, as the impact of TMFs on outcomes was not the objective of this review. To describe how TMFs were selected, used, and reported, we used several strategies.

First, we used directed content analysis to organize the reported criteria used by authors to select TMFs. The rationales presented by authors were coded using Birken[29] criteria and definitions, which were based on seminal articles and an iterative consensus process. The categorization was completed by one reviewer (MV) and verified by a second reviewer (AF). Second, segments of the ImplemeNtation and Improvement Science Proposals Evaluation CriTeria (INSPECT) were used to appraise TMFs selection, use, and reporting. INSPECT is a validated scoring system that assesses key elements of an implementation science proposal [30]. Adaptations to the INSPECT included detailed specifications for each one of the evaluated aspects (i.e., selection, use, and description). For TMFs developed for the child care setting, we used Moullin[31] criteria to rate the degree and depth of elements included. Assessments were completed by two independent reviewers (MV and EZ) with disagreements resolved by discussion.

Data synthesis

Frequencies and proportions were used to describe the number of studies, year of publication, geographical area, research design, study outcomes, strategies, type of TMF used, and number of TMFs used at a time. Based on the characteristics of the TMFs identified, we created four categories (typology informed by Nilsen[18] and Rimer[32]) to organize the theoretical approaches:

1. Individual-focused approaches: described or explained factors that act as barriers or facilitators to implementation at the individual/interpersonal level. Some approaches also proposed mechanisms and strategies that could be used to promote change at the individual/interpersonal level.
2. Community-focused approaches: described or explained factors that act as barriers or facilitators to implementation at the organizational/community level. Some approaches also proposed mechanisms and strategies that could be used to promote change at the organizational/community level.

3. Process or stage-focused approaches: described the process or described/explained stages of implementation.
4. Evaluation-focused approaches: described indicators of implementation success.

Details on how different TMFs were used across studies are presented in descriptive tables and narrative format. All members of the research team reviewed the findings and their feedback was incorporated.

3.4 Results

Characteristics of included studies

The search strategy resulted in the selection of 38 studies (primary and secondary studies) in which 28 unique TMFs were identified (Figure 3.1). Overall characteristics of included studies were synthesized into a tabular format (Table 3.2).

The interventions implemented in the included studies varied from policies, programs, and practices in areas related to healthy eating, physical activity, food safety, and breastfeeding. More than one-half of the studies (n=21; 55%) were related to food and/or nutrition policies, programs, or practices alone, and were not combined with a physical activity component. Most of the studies described implementation strategies (n=24; 63%), while others reported on dissemination strategies (n=5; 13%). Implementation strategies typically used active strategies that included training, consulting, goal setting, feedback, reinforcements, and rewards. In contrast, dissemination strategies generally employed passive strategies such as the development and distribution of printed and virtual educational resources.

Characteristics of TMFs

Twenty-eight different TMFs were identified across the studies. Five of the 28 (18%) approaches were developed specifically for child care settings. A summary of TMFs types, use, and limitations as reported by authors is presented in Table 3.3. Further information on the strategies used and other characteristics of the included studies are found in Appendix B.

Selection, use, and report of TMFs across studies

About 19% (n=7) of the studies used more than one type of TMF at a time. As such, the denominator for the percentages presented throughout this paper refers to both the number of studies included and the number of times that TMFs were used. Beyond that, an illustration presenting TMF's overall selection criteria is presented in Figure 3.2. And Figure 3.3 presents TMFs selection, use, and reporting across TMFs types and study objectives.

Individual-focused approaches

Eighteen (47%) studies included in this review utilized an individual-focused approach alone or in combination with others. Of the 19 times that individual-focused approaches were used, 68% (n=13) of them were used to inform the development of implementation strategies, 26% to identify factors related to implementation (n=5), and 5% to explain outcomes (n=1). When individual-focused approaches were used to develop implementation strategies, (n=5) 38% presented limited information on supporting evidence, (n=6) 46% did not integrate the approach with the study objectives, design, and outcomes, and (n=8) 62% did not describe how constructs were applied (Figure 3.3a).

Three theoretical frameworks, Bandura's Social Cognitive Theory (SCT) (n=8; 42%), Rosenstock's Health Belief Model (HBM) (n=3; 16%), and Michie's Theoretical Domains Framework (TDF) (n=2; 10%) were the most commonly used individual-approaches. The most frequently used criteria described by authors for selecting the individual-focused approach was TMF's description of different factors that affect individual behaviours (n=6; 32%) and previous use of TMFs in empirical studies (n=6; 32%).

Only three studies (17%) described the limitations of individual-level approaches used. To begin, the authors stated the HBM had limited capacity to predict child care provider's behaviours [49]. Social Cognitive Theory may not sufficiently account for the interaction of the characteristics of the intervention, providers, child care facilities, and the context outside the child care centre [33]. Moreover, the Theoretical Domains Framework constructs may not explain pathways of change in provider's behaviours, and their assessment could be lengthy [45-47].

Community-focused approaches

Fourteen studies (37%) used community-focused approaches alone or in combination, and Rogers's Diffusion of Innovations (n=4; 29%) was the most commonly used. In general, community-focused approaches were used to inform implementation strategies (n=4; 29%), identify factors related to implementation (n=4; 29%) and explain outcomes (n=1; 7%). The lack of supporting evidence reported in the studies was observed across all different uses of the approaches (Figure 3.3b). Five (36%) of the community-focused approaches were developed specifically for centre-based child care services, including frameworks that encompassed factors that affected practices described in existing standards for centre-based child care services (n=3; 60%) and implementation of food and nutrition and physical activities policies and practices (n=2; 40%).

The primary criteria study authors used for selecting a community-focused approach varied, but most were motivated by the TMF's description of factors that affect changes at the organizational/community level (n=4; 29%). Only one (10%) study described limitations for community-focused approaches: the lack of validated measurement tools to access constructs embedded in the Consolidated Framework for Implementation Research [57].

Process or stage-focused approaches

Ten studies (26%) used a process or stage-focused approach alone or in combination, which tended to be used to inform implementation steps (n=9; 64%). Lack of description of existing supporting evidence, TMF's integration and reporting were observed across almost all different uses (Figure 3.3c).

Intervention Mapping[91], a multi-step process for developing interventions, was used by two studies (n=2; 29%). Three of the process-focused approaches (21%) also encompassed evaluation aspects: the Model of Intervention Implementation, Participant Use, and Mediating Variable Change [92], Chen's Action Model [93], and Fit-or-Fix [94]. The first approach organized moderators, mediators, and steps useful for developing implementation strategies and

allocating resources for a specific change [92]. Chen [93] presented factors and strategies for mixed methods evaluations. And the Fit-or-Fix described process and factors to be considered in process evaluations. Two (14%) of the process-focused approaches used were developed specifically for centre-based child care services. One was the Assess, Identify and Make it happen for preschools (AIM-P); the other was a set of steps to help local leaders with the implementation of healthy eating policies and practices in preschools [86] based on the Plan-Do-Check-Act cycle [95].

The criteria often reported by authors for selecting a process-focused or stage-focused approach were based on TMF's provision of process guidance (i.e., provision of a step-by-step approach for application) (n=7; 50%) and previous application of the approach to the child care services (n=3; 21.5%). The limitations of the approaches were only mentioned for the Precede-Proceed (P-P) model: that was related to the lack of detailed steps to guide intervention development [74].

Evaluation approaches

In the category of evaluation approaches, the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) was the only one identified. It was used alone by two studies to assess program effectiveness along with dissemination, adoption, and implementation [35,90]. The RE-AIM was used to inform implementation outcomes and its selection was supported by existing evidence; it was well integrated and described (Figure 3.3d). No limitations were presented for RE-AIM.

3.5 Discussion and Conclusion

The results showed that studies aiming to change centre-based child care provider's behaviours and environments used different types of TMFs targeting different socio-ecological levels (i.e., individual, community) and purposes (i.e., process and evaluation-focused approaches). For instance, TMFs were used to identify implementation factors and inform the development of implementation strategies, guide implementation steps, explain outcomes for

evaluation and support recommendations for research and practice. We will discuss the variety of TMFs used and their different applications, and some trends that could limit the benefits of using TMFs as a result of inconsistencies in the selection, use, and reporting.

TMF's selection

Studies aiming to promote healthy eating environments in centre-based child care services presented a tendency, already reported by other authors [96], to over-rely on individual and interpersonal factors to promote change in child care centres. Although well-established and recurrent [97] individual-focused theories such as the SCT and HBM are useful to plan implementation strategies and evaluate mechanisms of change, they might not be sufficient to ensure a change in child care centres. For example, the use of individual-focused approaches such as the SCT, HBM, and TDF can have limited capacity to predict a change in centre-based child care provider's behaviours [45,49,51]. Limited predictive capacity might be attributed to the fact that organizational factors (e.g., peer and organizational support opportunities to practice new behaviour [82], academic teaching climate [33], and environmental factors [34], including policy context (e.g., changing licensure requirements) [68], also play important roles in changing child care centres environments and providers behaviours. As such, the use of TMFs targeting broader socioecological-levels and different aspects of the implementation would be advantageous as it allows a systematic consideration of implementation factors, steps, and outcomes [18]. The combination of TMFs was not a common practice across identified studies. One example includes Roberts-Gray et al. [80] and Sweitzer et al. [79] "Lunch is in the Bag" study. They used Intervention Mapping to guide the program adaptation; the Theory of Planned Behaviour (TPB) and SCT were used to guide the activities and message development; and the Fit-or-Fix was used to identify feasibility issues, outline the adaptability plan (e.g., tailoring materials for cultural differences), and anticipate required support for implementation.

Beyond the careful selection of TMFs, better reporting practices of the selection criteria and process are also required. Detailed reporting of TMFs selection might help to build a

stronger argument for TMFs appropriateness to study objectives and settings characteristics. The criteria most often reported by studies promoting healthy eating in child care centres were the TMF's description of factors that affect change process or process guidance, and the description of available empirical evidence that could support the proven utility and effectiveness of the selected TMFs were less often described. The benefits of selecting TMFs with proven empirical utility and effectiveness, particularly for the development of implementation strategies, include the development of strategies that are evidence-based and less likely to waste already scarce resources. Where limited empirical evidence is available, as not all of the available TMFs have yet been empirically tested [98], authors should make it clear to the readers, and highlight the formative nature of the study and attempt to build TMFs evidence[60]. Selection of TMFs driven by convenience, a tendency also observed in a prior survey with implementation researchers [29], might account for the weak arguments (i.e., descriptive rather than predictive or explanatory) sometimes presented by study authors in favour of TMFs selected across studies promoting healthy eating in child care centres.

The limitations previously described might be attributed to the fact that careful TMF's selection would require, from child care researchers and practitioners, a refined level of expertise and familiarity with existing TMFs and their different purposes. As many child care researchers and practitioners may not be adequately trained or prepared in doing so [98], the engagement of implementation researchers as part of implementation teams is something that has been suggested in other settings to improve TMFs use [99]. Alternatively, increasing child care researchers' and practitioners' awareness of existing TMFs and tools to guide TMF selection might also overcome the reliance on individual-focused TMFs and the use of approaches where limited evidence for their effectiveness exist. For example, tools such as the Theory Comparison and Selection Tool (T-CaST), which was developed to be user-friendly for both researchers and practitioners[100], can promote reflection and consideration of different socioecological-levels, processes, and outcomes. However, more explicit recommendations that a combination of TMFs

are almost always necessary to address implementation endeavours complexities might be required.

TMF's use

The integration of TMFs across study objectives, design, and outcomes is particularly important for the development of evidence of the TMFs effectiveness and generalizability to child care centres. For example, if selected TMF's constructs are not considered in both development and evaluation stages, it becomes difficult to ascertain if changes observed in child care centres were caused by changes in targeted TMF's constructs or by other factors [58]. This might lead to erroneous assumptions about the effectiveness of selected TMFs in the child care setting. Without proper TMF's integration across studies objectives, design and outcomes implementation efforts become "theoretically-inspired" rather "than theoretically-informed" [101].

Lack of integration of TMFs might be attributed to the fact that researchers and practitioners may not be aware of how TMFs should be used. That was also highlighted in a recent review, with recommendations that TMFs developers might consider developing practical tools to help less experienced researchers and practitioners in incorporating TMFs [102]. In the case of individual and community-focused approaches, integration might also be constrained by the lack of validated tools or alternative strategies to assess existing TMFs constructs. Some of the studies found in this review describe quantitative and qualitative forms of inquiry-based on some of the existing individual and community-focused approaches (i.e., SCT, HBM, TDF, Diffusion of Innovations, and CFIR), which could facilitate the measurement of TMFs selected constructs.

TMF's reporting

Beyond careful selection and integration, reporting of TMFs selected elements are also required, as we observed a tendency of some authors to reference a TMF and "leave it there"[103]. Underreporting is something that has also been identified by reviews in other settings [99,104]. The lack of detailed reporting of the application of TMFs makes it difficult for readers to understand

how TMFs were operationalized or adapted to fit in the child care centres context. Detailed reporting of TMFs operationalization is particularly important considering that modifications are often necessary when using TMFs originated in other fields. Detailed reporting of TMFs operationalization would help readers to visualize whether TMFs constructs, as applied or adapted, remain true to original TMFs and do not become a weakness of the proposed study[105]. Detailed reporting of TMFs operationalization is also fundamental in the replication of successful strategies, assessment tools, and evaluation outcomes. It was also not common across studies in this review to describe the limitations of TMFs used. Reporting on the limitations of TMFs should be encouraged as it helps to build an understanding of the TMFs utility in the child care setting.

Under-reporting might be attributed to unawareness of proper reporting practices or space restrictions in journals. Tools such as the Standards for Reporting Implementation Studies (StaRI) Statement present elements required in implementation studies and could lead to high-quality reporting of implementation studies[106]. Also, details about the use of TMFs application can be made available as separate papers, appendixes, or upon request to overcome space restrictions in journal articles[106].

This scoping review included an extensive list of TMFs that child care service researchers and practitioners can choose from for future use. Although not exhaustive, we also identified quantitative and qualitative forms of inquiry-based on some of the existing approaches (i.e., SCT, HBM, TDF, Diffusion of Innovations, and CFIR), which could address measurement issues. Moreover, we discussed selection and reporting tools such as the T-Cast, StaRI, and INSPECT, that could improve the selection, use, and reporting of TMFs in implementation studies. We also listed studies with a good selection, application, and reporting practices, and those could be used as examples by researchers and practitioners in child care services. Ultimately, the use of a methodological framework to conduct the review, the breadth of the bibliographic screening employed, the inclusion of content experts, the independent first level

screening and appraisal of TMFs rationale, use and reporting, were additional strengths of this review and contributed to its relevance.

The primary limitation of this review is that many studies were excluded because they did not explicitly mention the use of theoretical approaches. Although including those studies would have increased the list of TMFs identified, the studies themselves would provide little information about the use of the approaches within centre-based child care services. As described before, we did not explore the methodological quality of the included studies as this was beyond the objective and scope of our study. However, based on the number of studies identified, this is something that could be explored in future systematic reviews on the impact of the use of different numbers or types of TMFs in the implementation of healthy eating interventions in centre-based child care services. Although we did a systematic search across various databases, we cannot ensure that all studies using a TMF were identified. However, the approaches identified represented the entire spectrum of TMFs categories. We avoided the use of words such as “theory,” “model” and “framework” as it would also create confusion, considering the lack of standardization in the terms employed across studies. We attempted to use systematic terminology and agree with Nilsen [18] that it is of less concern which label is assigned to each approach, but rather, whether each approach is used appropriately, regarding their assumptions, aims, and other characteristics. Moreover, the full paper assessment and data extraction were performed by a single reviewer (MV) and reviewed by a second member of the team when questions or concerns arose (AF). To reduce any error, clear inclusion and exclusion criteria were developed, tested, and documented, as well as clear definitions for data extraction. Although consultation with experts would have enhanced the relevance of the findings for research and practice, it was not conducted due to time and complexity. However, the results from this review form the basis of a consultation exercise that can be further conducted with experts. These limitations notwithstanding, we believe this scoping review is a comprehensive

summary of the variety, use and reporting of TMFs in implementation studies targeting healthy eating in centre-based child care services.

In summary, this scoping review identified that a variety of TMFs have been used in the implementation of healthy eating interventions in centre-based child care services in recent years, yet the focus on individual-level TMFs, poor TMF selection, and application and reporting for the development of implementation strategies could limit TMF's utility. Proper selection, use, and reporting are required if we are to understand the contributions and limitations of TMFs to outcomes observed. As child care services researchers and practitioners may not be adequately trained or prepared in selecting, using, and reporting on the use of theoretical approaches, efforts to increase awareness of existing user-friendly and practical tools are recommended as the next steps.

Table 3.1 Inclusion and Exclusion criteria

Inclusion criteria

1. Setting: Child care centers or day care centres, nurseries and kindergartens or preschool;
2. Phenomena of interest: (a) Dissemination, adoption/uptake, implementation or routinization of interventions; (b) Development, delivery or evaluation of implementation strategies;
3. Content: Healthy eating (e.g., fruit and vegetable intake, reduction of sugar/ salt/ fat), obesity prevention (only if include a nutrition component), food literacy, food safety and food security
4. Outcome of interest: (a) barriers, constraints, enablers, facilitators, implementation factors; (b) theories, models or frameworks.
   Source: no restriction

Exclusion criteria

First stage:

1. Setting: Family day care centres, centres for children with special needs, elementary schools (if not directed to toddlers [1 - 3y] and preschoolers [3 - 5y]), secondary schools, after school programs, villages or communities, primary care units, day camps, foster homes, rehab centers or only directed to infants (< 1 year);
2. Phenomena of interest: Do not focus on child care provider or aspects of the child care environment;
3. Content: Eating disorders, anaphylaxis management, food or nutrient supplementation, dental health, or welfare.
4. Outcome of interest: Discussed barriers, constraints, enablers, facilitators or factors or process or steps related to implementation not integrated into a theory, framework or model;
5. Source: Cookbooks; Info sheets; Videos;
6. Date of publication: no restriction

Second stage:

1. Setting: + Nurseries, kindergartens or preschool is not the only target;
2. Phenomena of interest: + Outcomes reported only refer to children or parents.
3. Content: no addition
4. Outcome of interest: + list TMF without mention how it was used;
5. Source: + Reports (government, annual, technical, research, etc); Book chapters; Program guides; Training or workshops resource; Unpublished; Abstracts.
6. Date of publication: Published before 1990.
7. Language: Not English, French, German, and Korean.

Table 3.2 Summary characteristics of included studies (n=38)

Year of publication	n	%
1990 - 2000	2	5%
2001 - 2010	8	21%
2011 - 2018	28	74%
Geographical area		
USA	25	66%
Australia	9	24%
Canada	2	4%
Germany	0	0%
Denmark	1	3%
Europe	1	3%
Research design		
Quasi-experimental	15	39%
RCT	6	16%
Qualitative	8	21%
Survey	6	16%
Other[1]	3	8%
Study outcomes		
Implementation	27	71%
Implementation and effectiveness	11	29%
Implementation strategy		
Implementation	24	63%
Dissemination	5	13%
Other[2]	9	24%
TMFs use		
Individual-focused approach alone	14	37%
Community-focused approach alone	10	26%
Processual or stage-focused approach alone	7	18%
Evaluation-focused approach alone	1	3%
Combination of approaches	6	16%
Number of different TMFs types used at a time		
1	31	81%
2	6	16%
3	1	3%

[1] other include studies that were either commentaries (n=2) or descriptive (n=1)
[2] other include studies that did not describe the implementation strategy (n=3), provided only recommendations for implementation (n=2); or described only the development of an intervention or framework (n=4)

Table 3.2 Detailed use of TMFs across studies.

TMF name	Reason for use	How it was used	Limitations And Recommendations
Individual-focused approaches			
Social Cognitive Theory (SCT)	Disciplinary approval [33] Empirical support [33,34]. Constructs of interest [34-36] Implementation strategies [36] Description of a change process [37-39]	Design implementation strategies [33-44] Identify factors [36]	Focus on individual-level determinants is a limitation of SCT [33]; Individual-level change must be supported by environmental intervention efforts [33,37] Cultural and environmental factors affect program outcomes [38] Success might be explained by professional and interactive workshops – inviting personal reflection [44] Assess actual skills [34]; measure changes in constructs, such as improvements in self-efficacy [33]. Assess the influence of perception and motivation on obesity prevention [41]; collective efficacy [36]; parental pressures and an academic teaching climate [33];
Theoretical Domains Framework (TDF)	Comprehensiveness [45,46] Associated method [45] Empirical support [46]	Identify factors [45,47] Design implementation strategies [46,48]	TDF measure can be lengthy [47] TDF measure may not be sufficiently discriminant for this setting [45];
Health Belief Model (HBM)	Empirical support [49,50]	Identify factors [49,50] Design implementation strategies [51]	Constructs were added to HBM: Health locus of control and Motivation (to improve prediction) [49]; Self-efficacy and Behavioural intention (to determine confidence and intention) [51]; Provider beliefs and misconceptions should be addressed to promote a sense of efficacy [51].
Technology Acceptance Model (TAM)	Simplicity/parsimony [52] Empirical support [52]	Identify factors [52]	Assessed intention to use, rather than actual use as a limitation[52]

			Assess characteristics associated with ease of use and perceived usefulness; perceived usefulness/ease with actual use[79] Integration of strategies to increase usefulness [52]
Transtheoretical model of change	Description of a change process [53]	Design implementation strategies [53]	
Adult Learning/ Learning by Dialogue	Inclusion of change strategies/techniques [54] Description of a change process [55]	Design implementation strategies [35,54,55]	
Theory of planned behavior	Description of a change process [56]	Explain outcomes [56]	
Community-focused approaches			
Consolidated Framework for Implementation Research (CFIR).	Comprehensiveness [57,58] Empirical support [58]	Design implementation strategies [58,59] Identify factors [57]	Not measurement of change in CFIR constructs as limitation [59]; And the lack of available validated instruments to assess the theoretical constructs of the CFIR [57].
Community Capacity	Description of a change process[60]	Design implementation strategies [60-62]	
Diffusion of Innovations (DoI)	Description of a change process [33,34,63] Disciplinary approval [64] Analytic level [33,65]	Design implementation strategies [34] Identify factors [64] Explain outcomes [64]	Include non-adopters in future studies[64];

Social Network Analysis	Constructs of interest [66] Disciplinary approval [66]	Identify factors[66]	Explore: the external network influence on sharing of skills between centers[66]; The impact of networks on the environment[66]; The role of prior interventions in creating additional external networks[66]
A conceptual framework for organizational readiness to implement nutrition and physical activity programs in early childhood education settings.	Inform assessment [67]	Develop own approach [67]	Timing should be considered when using the framework [67]
Factors that influence the menu at child care centers	Inform implementation efforts [68]	Develop own approach [68]	Training should be sensitive to child care mission and culture and address problems frequently observed [68]
Factors that impact preschool teachers' ability to teach nutrition in their classrooms	Inform implementation efforts [69]	Develop own approach [70,69]	Framework must be tested with other content areas [70]
Factors influencing the food purchases of early care and education providers.	Inform implementation efforts [71]	Develop own approach [71]	
The Spectrum of Opportunities Framework for State-Level Obesity Prevention Efforts Targeting the Early Care and Education Setting	Inclusion of change strategies/techniques [72] Process guidance [73]	Identify key actors [72] Recommendations [73]	

Process-focused approaches

PRECEDE-PROCEED (PP)	Application to a specific setting [74] Process guidance [74]	Implementation steps [74-78]	PP models lack a step-wise practical guide for the development of the intervention development[74]; Consideration of policy and sociocultural factors increase the likelihood of behaviour change [74];
Intervention Mapping Approach (IMA)	Application to a specific setting [79] Process guidance [74,79]	Implementation steps [74,75,77,79-81]	Behaviorally based nutrition knowledge creates a solid foundation for a good program[82] Embracing the idea of designing with the user in mind[80]
Baranowski & Russell model	Description of a change process [83]	Implementation steps [83]	Holistic efforts that include the family, home environments and child motivation to make healthy choices in addition to policy changes may have a synergistic effect on child-level obesity outcomes [84]
Organizational change stage	Description of a change process[85]	Design implementation strategies[85]	
Harris steps for stakeholders		Implementation steps [63]	
Plan, Do, Check Act (PDCA) cycle.	Process guidance [86]	Recommendations [86]	Kindergartens are to take a more reflective and active role in policy implementation, keeping in mind kindergarten goals and support available [86]
Fit or Fix	Simplicity/parsimony [80] Process guidance [80]	Implementation steps [80]	
The Spiral Technology Action Research (STAR) model	Comprehensiveness [87] Process guidance [87]	Implementation steps [87]	

Logic model for how an intervention can support an early childhood education (ECE) program to create a written breastfeeding (BF) policy.	Inform implementation strategies [88]	Develop own approach [88]	
Chen- theory-driven evaluation	Explanatory power [80]	Implementation steps [80]	
Assess. Identify. Make it Happen (AIM)	Empirical support [89] Application to a specific setting [89] Process guidance [89]	Implementation steps [89]	Developing a more flexible version of AIM-P for child care home settings [89]
Evaluation-focused approaches			
RE-AIM	Application to a specific setting [35] Uniqueness [90]	Specify outcomes [35,90]	Outcome variables used did not directly reflect intended outcomes (i.e., ordering of materials to indicate use)[90]

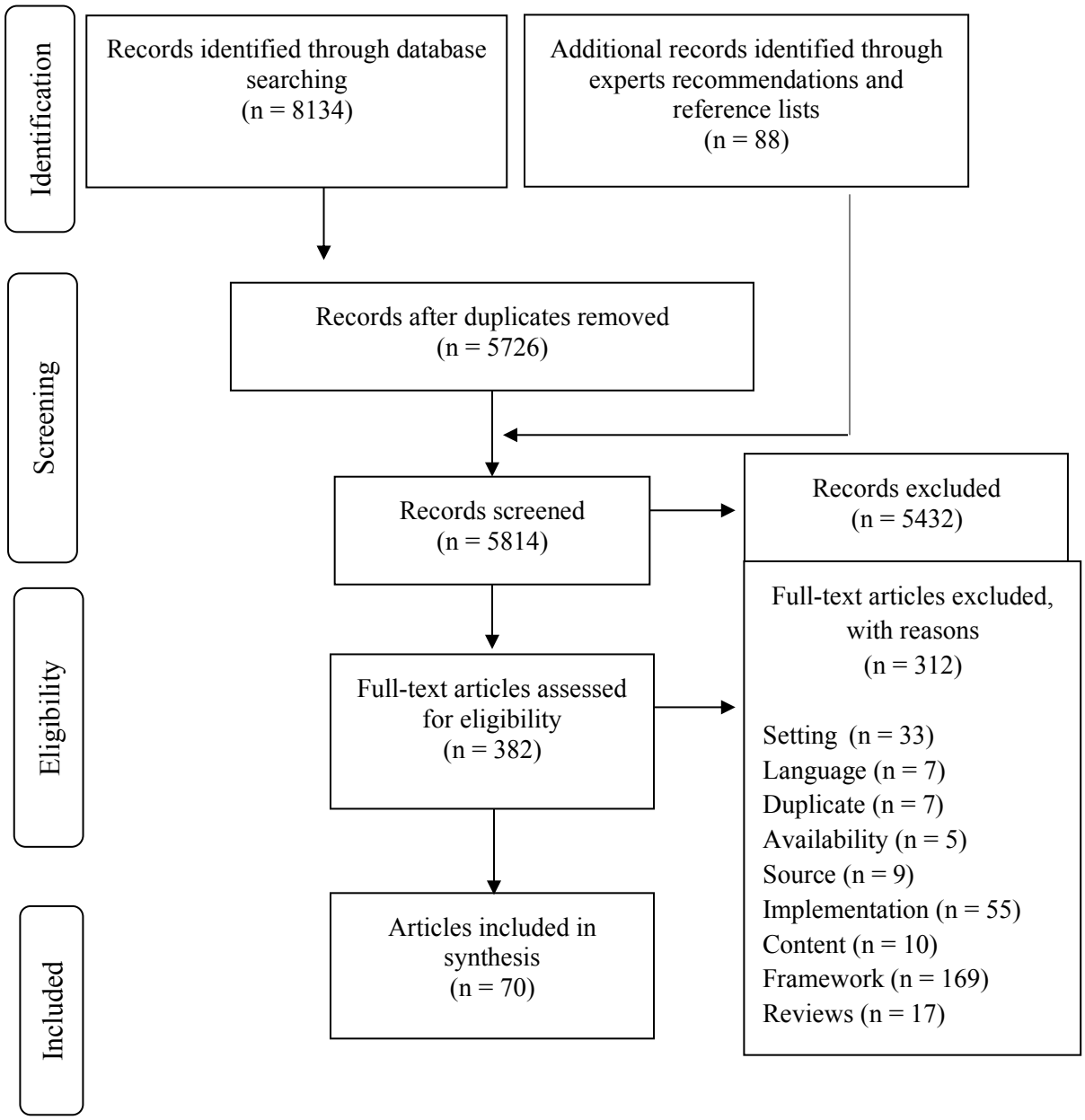


Figure 3.1 PRISMA Flow Diagram

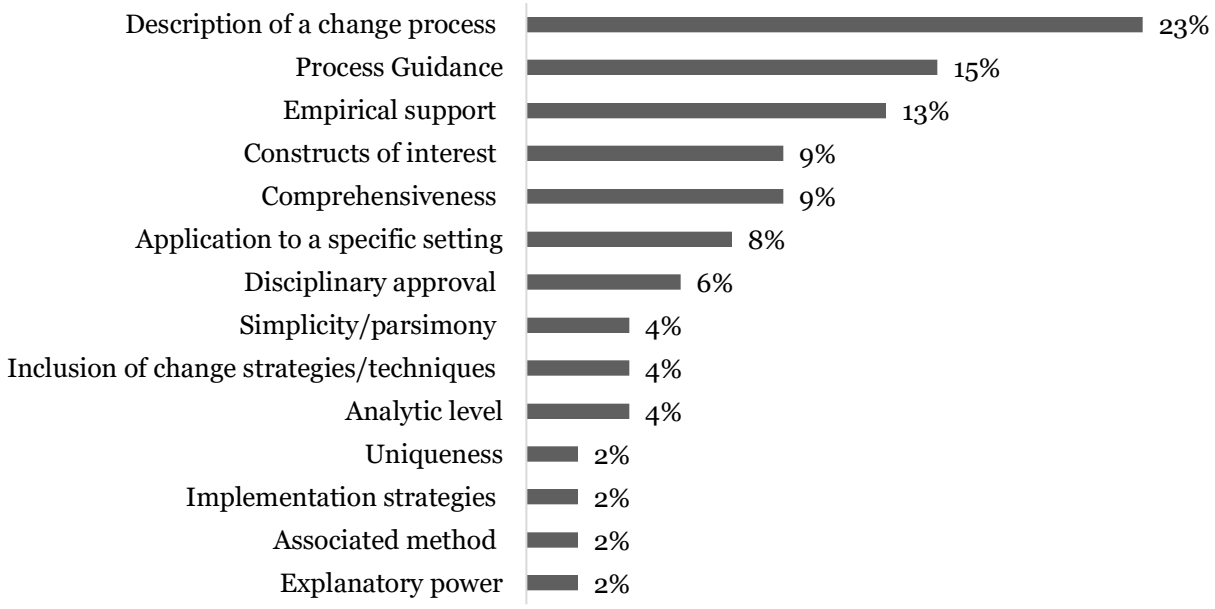


Figure 3.2 Reasons for Selection of Theoretical Approaches

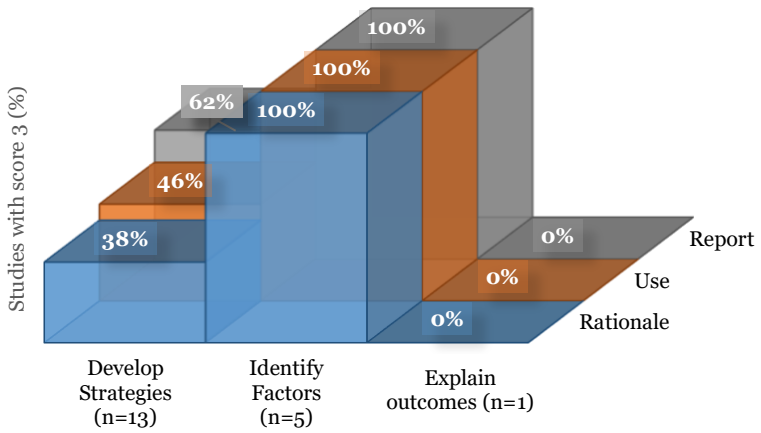


Figure 3a. Individual-focused approaches (n=19)

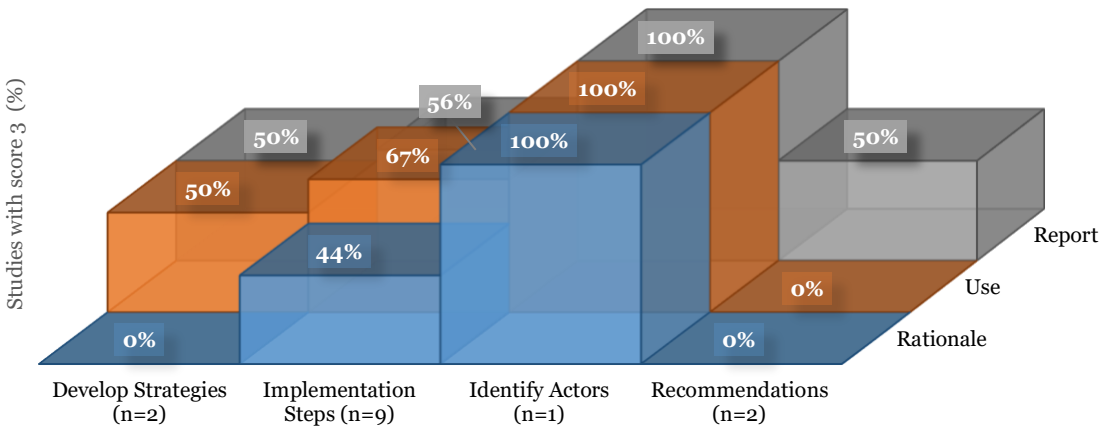
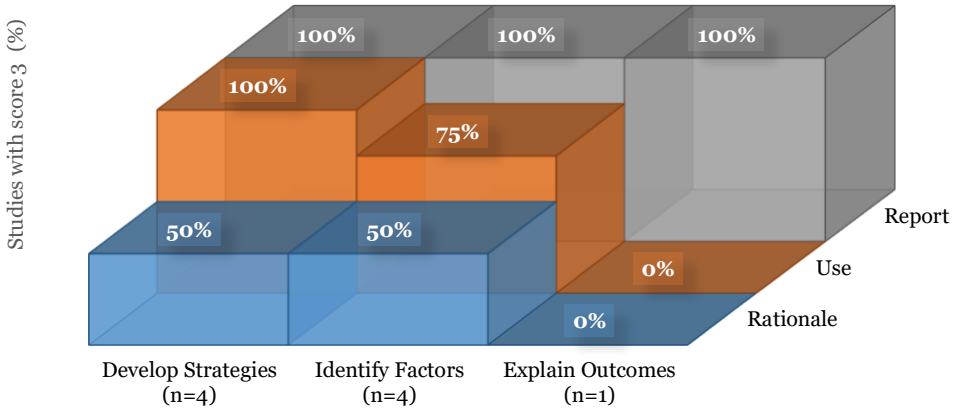


Figure 3c. Process-focused approaches (n=14)



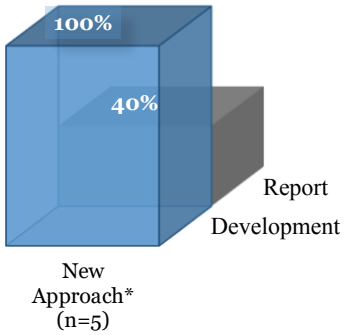


Figure 3b. Community-focused approaches (n=14)

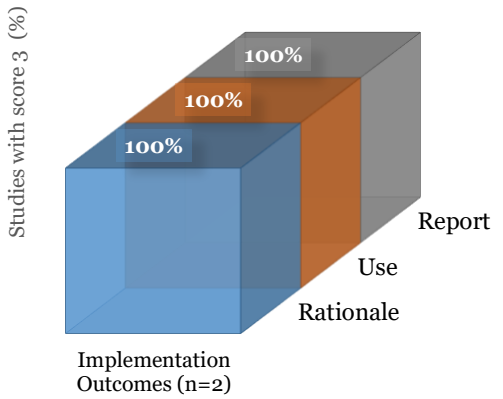


Figure 3d. Evaluation-focused approaches (n=2)

Figure 3.3 Percentage of studies with score three on the rationale, integration and reporting practices evaluated using the INSPECT and Moullin criteria.

Note. n represents the number of TMF uses in total and in each category. Percentages represent TMF uses that achieved a score of three. Characteristics required for studies to achieve a score of three: Rationale (the rationale for the selection of the theory, model or framework is supported with citations from the literature); Use: the TMF is used to frame the proposed study in all aspects including the study questions, aims/objectives, hypotheses, process, and outcome measures; Reporting: the use of the TMF is clearly described, with elements (factors, steps or stages) explicitly described within the proposed setting, population, and intervention contexts (Adapted from Crable et al., 2018). *Characteristics required for studies developing a new approach to achieving score three: Development (the approach itemizes a comprehensive range of factors or strategies based on a literature review or evaluations covering each of the concepts included in the framework); Reporting (Factors, strategies, or evaluations provided with descriptions which included the relationships between or within the elements (factors, strategies, and evaluations) or mechanisms for operationalization). (Adapted from Moullin, Sabater-Hernández, Fernandez-Llimos, & Benrimoj, 2015).

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4 Are there Gaps in Nutrition Policy Implementation in Child Care Centres in Alberta? A Cross-sectional Survey.

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4.1 Introduction

The first years of life are critical in establishing healthy eating behaviours in children [1]. As one-third of children in Canada spend on average 30 hours a week in child care [2], child care settings play an important role in shaping children's eating behaviours, nutrition and health [3,4]. However, to date, little research attention has been paid to the quality of child care food environments [3].

Some research suggests that there are inadequacies in the quality of the meals [5–10] and mealtime practices provided in child care settings [11]. Although limited information is available in Canada, studies conducted in a few Canadian provinces found suboptimal meals and mealtime practices in child care [12–14]. There is growing evidence that nutrition policies positively influence child care food environments [15–17]. Nutrition policies are described as formal or informal rules or standards [18] that aim to fulfil the nutritional needs of children [19] in child care. Examples of policies influencing child care food environments include legislation, regulations, and standards set at the federal, provincial, municipal, or service level (i.e., in child care centres or day homes) [20].

In Canada, child care settings encompass different arrangements, including home-based care (e.g., family day home, family daycare, home child care) and centre-based care (e.g., child care centre and daycare program) [2]. Child care in Canada is not regulated by one universal regulatory body, rather regulations are set by individual provinces and territories. These regulations include general statements regarding food handling, food provision and feeding arrangements, with very few mentioning feeding practices and the promotion of healthy nutrition habits. Canadian provinces have also encouraged the development of nutrition policies

by the child care program (or administrative policies) [21], and in some cases, such policies are a requirement for licensing [22]. Administrative nutrition policies have the potential to orient healthy eating practices [15] and promote consistent healthy meals and mealtime practices in child care settings [23,24]. However, existing evidence suggests there is a disconnect between administrative policies and practices in child care [25–27].

For administrative policies to be implemented in child care settings, buy-in is required from child care providers [28,29] as well as sufficient knowledge and resources to enable their implementation [25,27,29]. However, no previous study in Canada has described the implementation of administrative nutrition policies in the child care setting, meaning that this is still an under-studied area.

4.2 Objectives

The purpose of this study was to describe (i) nutrition policies in child care centres, (ii) the resources and strategies used to enable policy implementation, and (iii) the association between policy implementation and child care or administrator characteristics.

4.3 Methods

Design

This study utilized a cross-sectional survey. This cross-sectional survey is part of a larger sequential mixed-methods project [30], with each stage being reported separately [31]. The survey was administered across child care programs from the Edmonton metropolitan region in Alberta between October 2018 and June 2019 using REDCap [32,33] a secure electronic data capture tool hosted by the Women and Children's Health Research Institute at the University of Alberta. This study received research ethics approval from the University of Alberta Research Ethics Board (Pro00081965).

Survey development

The cross-sectional survey, the *Implementation of Nutrition Policies in Child care Survey* (INPC-S), was developed for this study. The INPC-S includes 18 closed- and open-ended questions organized in three sections: 1) nutrition policy characteristics, 2) resources and processes for implementation and 3) sociodemographic characteristics. The questions in the first section of the INPC-S were informed by the *Alberta Nutrition Guidelines for Children and Youth* (ANGCY)[21]. The ANGCY are voluntary nutritional guidelines that were distributed province-wide in print and electronic formats to child care centres in 2008 [34]; they are currently only available in electronic format. The ANGCY provides recommendations for policy development in the child care setting. For the second section of the survey, we adapted questions from the *Level of Institutionalization Scale* (LOIn) [35]. The LOIn is the only instrument assessing "integration of a practice within a service setting" that has strong evidence for validity and reliability [36]. The LOIn has also been applied in Canadian elementary schools and showed satisfactory psychometric indicators [37]. The primary adaptations of the LOIn for the current study included minor wording changes. The second section asked about nutrition policy implementation, including policy goals, implementation plans and schedules, support for implementation, assigned responsibilities, and evaluation. The final section of the survey included questions about child care centre characteristics and sociodemographic information about administrators (See Appendix J). Except for eligibility items, responses were not mandatory, and non-response (i.e., "I don't know") options were also provided.

Survey pre-testing and pilot testing

All survey questions in the INPC-S were pretested for clarity and comprehension. First, a 2-hour table discussion using the *Questionnaire Appraisal System* (QAS) [38] was conducted with three researchers with expertise in early childhood development, child care, and survey design. The QAS is a short and effective guiding tool to identify problems in survey instructions, clarity,

assumptions, and response format [39]. Second, two public health dietitians with experience in child care were selected by convenience and provided feedback on the INPC-S via email. After minor edits were made, the survey was pilot-tested with 30 child care centres, which were not included in the final sample. The pilot aimed to verify the survey questions appropriateness in terms of comprehension and applicability, and the functioning of data collection systems.

The survey was initially administered via telephone (n=8). The initial questions were focused on the implementation of the ANGCY. But during the telephone-based administration, very often, child care administrators had mistaken the ANGCY for other documents such as the Canada Food Guide or the Health and Safety Guidelines for Child Care Facilities. To alleviate this confusion, questions were rephrased with the main focus on administrative nutrition policies. In addition to the change in the focus of the questions, minor changes were made in the wording of some items to improve clarity and one sub-item was included. Moreover, the telephone-based administration mode was deemed appropriate as good response rates were obtained in previous research with child care centres by this team and others [40,41]. However, in our sample, it was difficult for child care administrators to take time away from their duties to answer the telephone-based survey, thus the survey was converted to an online format. Of the 22 child centres that were invited to answer the survey online, 2 completed it. In summary, the pilot resulted in changes in the survey focus, wording, and mode of administration.

Participants and recruitment

Two strategies were used to recruit child care centres. First, a list of child care programs in Alberta was obtained (https://open.alberta.ca/opendata/childcareinformation). As the list only included addresses and phone numbers, email addresses were searched on child care centres' websites or social media pages. When email addresses were not available, centres were contacted by telephone to inquire about their interest in participating in the survey and to collect contact information. Second, information about the survey was shared with child care

programs through the Association of Early Childhood Educators of Alberta newsletter (https://aecea.ca). Those that expressed interest were directed to a Google Form to determine eligibility. Child care programs were eligible for study inclusion if they (i) were centre-based (i.e., operated in commercial spaces, not in the provider's home), (ii) located in the Edmonton metropolitan region, and (iii) provided meals to children. After email addresses were obtained, child care centres were emailed an information letter along with the link to access the online survey that remained open for submissions for three weeks. Information letters described the purpose of the study, the approximate time to complete the survey, how data was collected and stored, and the name of the investigators. To optimize responses, each respondent received weekly reminders and a $10 gift card. All respondents had to provide consent before answering the survey.

Data analysis

To satisfy objectives one and two, we presented absolute and relative frequencies regarding nutrition policy characteristics and implementation resources and processes established by child care centres. For objective three, we first calculated Cronbach's α to assess the reliability of the items of the INPC-S. Then, Chi-square, Mann-Whitney, and Kruskal-Wallis were used to examine the relationship between INPC-S total score and individual items with child care and administrator characteristics. Outliers and incomplete surveys (<50% questions completed) were removed from the analysis. Statistical significance was set at $p<.05$. Analyses were carried out using the R-based open-source software Jamovi version 1.0.5.0.

4.4 Results

Sociodemographic characteristics

Of the 432 child care centres located in the Edmonton metropolitan region, 327 (76%) received the survey invitation. The remaining centres were not identified (n=19; 4%), not eligible (n=13; 3%), not interested (n=21; 5%) or had invalid email addresses (n=22; 5%), or had

participated in the pilot study (n=30; 7%). Of the 327 centres that were invited, 110 (34%) opened the survey and 53 (16%) completed eligibility questions. Of those, 43 (13%) provided sociodemographic information.

The sociodemographic characteristics of the child care centres are reported in Table 4.1. The majority of respondents were directors (n=20; 45%) or owners (n=20; 45%), with a post-secondary degree (n=31; 72%) and more than 5 years of administrative experience in child care (n=28; 60%). Around 65% (n=28) of centres have been in operation for more than 10 years, 82% (n=32) were located in a major city and about 10% were located in high socioeconomic areas.

Nutrition policy characteristics

A total of 52 centres provided information regarding existing nutrition policies (Table 4.2). The majority of centres (n=49; 94%) had a nutrition policy in place. On average, child care centres included five (range: 1 to 9) of the 10 content areas for nutrition policy suggested by the ANGCY. Food variety (n=35; 71%) and safety (n=35; 71%) were the most recurrent themes of the policy. Overall, three (range: 1 to 8) of the 12 stakeholder groups recommended by the ANGCY were engaged in the nutrition policy writing. Approximately one in five centres reported that only the child care administrator was responsible for writing the policies.

Nutrition policy implementation

Of the 49 centres that had a policy in place, 43 (88%) completed the implementation questions (Table 3). On average, respondents said they had about 9 of the 17 resources and processes described in the LOIn scale in place at their child care centres. Except for child care administrators' education level (p=.009; Kruskal-Wallis), no other differences were observed between the LOIn total score and child care/administrator characteristics (e.g., child care type, accreditation status, years of operation and administrator's years of experience). Overall, the majority of directors and/or administrators reported actively encouraging the implementation

of the nutrition policy (n=35; 87%) and that the nutrition policy had become part of the day to day practice (n=35; 83%). The least often reported item was 'centres had written evaluation reports of the implementation' of the nutrition policy (n=9; 22%).

4.5 Discussion and Conclusion

In this study, we aimed to describe (i) nutrition policies in child care centres, (ii) the resources and strategies used to enable policy implementation, and (iii) the association between policy implementation and child care or administrators' characteristics. The majority of the child care centres in this study had a nutrition policy in place. On average, child care centres had about 9 of the 17 implementation resources and processes assessed. Only the administrators' level of education was associated with the implementation score. Such findings suggest that although nutrition policies are common among child care centres in the Edmonton metropolitan region, there are still gaps to be addressed in terms of policy implementation.

The proportion of child care centres in our survey reporting a nutrition policy is higher than the proportion observed across other Canadian provinces (63%) [12] and other countries such as New Zealand (82.4%) [23], Ireland (66%) [42], and the USA (up to 33%) [26]. Many factors might impact the adoption of innovations [43], such as nutrition policies, by child care centres. The high frequency of child care centres that reported having a policy might be reflective of provincial documents (i.e., program plan template provided to child care applying for licensing and the ANGCY) recommending nutrition policies. However, considering that not all centres had a nutrition policy in place, further exploration of the factors that motivated centres to develop nutrition policies (or otherwise) could help to understand the need for more explicit or stringent policies previously recommended for this setting [34,44].

Active participation of providers and parents in policy development is not only recommended by accreditation requirements in Alberta [45] but encouraged across many existing guidelines for nutrition policy development at child care centres and schools [19,21,46,47].

Participation by parents in policy development can improve policy efficiency [19] and implementation in child care centres and increases parents' support of centre policies [41]. This could have the secondary benefit of reducing providers' challenges to enforcing policies [23] and continuity in health food environments between home and child care centres [24]. It is therefore concerning that providers, parents and other stakeholders (e.g., public health dietitians or nurses) in this study were frequently not often involved in policy writing. Similarly, low participation of providers and parents in policy development was also observed among child care centres in the United States and Australia [24,42]. Thus, it is worth exploring barriers related to parents' participation in policy development across child care centres.

Assigning resources to support continued implementation of nutrition policies seems to be a challenge among child care centres in the Edmonton metropolitan region, particularly in terms of securing providers' time and providers training in this area. Both allocations of providers time and training have been reported as barriers to the implementation of new healthy eating efforts in child care [48,49]. Child care settings may not have the capacity to support some of the recommendations within existing policies, such as holding healthy conversations during mealtime or sitting with children and eating the same food, all of which require sufficient knowledge on nutrition and sufficient foods to be shared, for example. Bearing in mind that the child care sector experiences high providers turnover [50] and that providers often receive limited training in nutrition [51], the continuous provision of training in nutrition seems crucial to ensure that both current and new providers have the knowledge and skills to adhere to with existing policies [42].

Evaluation of the implementation of nutrition policies is another area that requires improvement in Alberta's child care centres. Different types of evaluation (e.g., process, impact, outcome) of the implementation of nutrition policies would allow centres to identify areas for improvement and whether existing policies are impacting providers' practices [52] and children's

outcomes. However, findings from our study show such evaluations were not commonly conducted in many centres in Edmonton, Alberta. The use of strategies to improve accountability (e.g., monitoring and inspections) and the provision of incentives could have an impact on child care evaluation practices [53]. However, it is not clear if monitoring visits conducted across centres in Alberta monitor or enforce nutrition policy implementation [54], which might explain the lack of evaluation observed across centres.

We found it interesting that child care administrators with a higher level of education did not obtain higher scores on the implementation survey. It might be that child care administrators with better training in the administration of early learning programs, resulting in better systems to support nutrition policy implementation. For example, one previous intervention that provided leadership training to child care administrators in the US improved clarity of existing policies, providers' participation in decision-making, and opportunities for providers training [55]. However, we did not collect information on administrators' training in specific areas. Exploring the impact of different types of training on management practices could help to inform the curriculum for training and professional development in child care settings.

This study had some limitations. First, only self-reported information from one person was collected from each centre. Moreover, the response rate was low, which limits the ability to say that the findings presented represent child care centres in the Edmonton metropolitan region. It is also likely that administrators who were more interested in the topic were more inclined to take part in this research, suggesting that the proportion of centres with a nutrition policy might be lower in a representative sample. Ultimately, the LOIn questionnaire was not validated for the child care context; however, the questions were reviewed by different expert panels to ensure appropriate content and design.

In conclusion, the present study provided an initial picture of existing nutrition policies in child care centres, and the resources and processes in place to support policy implementation across a sample of 43 child care centres in Alberta. Although the majority of the child care centres in this study had a nutrition policy in place, there were gaps in implementation resources and processes in place at child care centres, meaning that additional support might be needed to build capacity for policy implementation in child care centres.

Table 4.1 Sociodemographic characteristics of participant child care directors and child care centres

Characteristics	Frequency	%
Role in child care		
Director or Manager	20	45
Owner	20	45
Operator	3	7
Other (registration agent)	1	3
Education		
Non-university certificate or diploma	12	28
University diploma bellow bachelor	8	19
Bachelor degree	12	28
University diploma or certificate	8	19
Master's degree	3	6
Experience in child care administration		
< 1 year	5	12
1 to 5 years	12	28
6 to 10 years	9	21
11 to 15 years	7	16
16 to 20 years	3	7
> 20 years	7	16
Number of children		
≤40 children	11	27
41 to 60	10	24
>60 children	20	49
Child care years of operation		
<1 year	4	9
1 to 5 years	8	19
5 to 10 years	3	7
> 10 years	28	65
Centre type		
For-Profit	22	54
Non-Profit	18	44
Doesn't apply	1	2
Accreditation Status		
Not accredited	7	18
Accredited	31	82
Location		
Major city	32	82
High socioeconomic area (>75th percentile)	4	10
Low socioeconomic area (<25th percentile)	12	31

Table 4.2 Nutrition policy characteristics of participant child care centres

	Frequency	%
Food and Nutrition Policy		
Yes	49	94
No	3	6
Changed FNP in the past 12 months		
Yes	25	56
No	20	44
FNP is readily available for staff		
Yes	38	88
Somewhat	5	12
Content of the FNP		
Food variety	35	71
Food safety	35	71
Availability of, and access to safe, nutritious foods	30	61
Adult role modelling of healthy eating	30	61
Positive mealtime environments for healthy eating (space, time, layout)	29	59
Definition of healthy food	23	47
Portion sizes	17	35
Nutrition education as part of the centre's program planning	16	33
Special events	11	22
Other (religious events)	1	2
People involved in FNP writing		
Child care centre administrators	37	75
Child care staff (early childhood educators, cooks etc.)	20	41
Parents	14	29
Child care licensing officers	12	24
Child care accreditation team	7	14
Environmental public health inspectors	5	10
Health promotion/wellness co-ordinators	5	10
Community/ public health dietitians	4	8
Community/public health nurse	4	8
Children	4	8
Dental health staff	1	2
Other[1]	3	6
I don't know	4	8
Child care staff responsible for FNP implementation		
Directors	35	71
Educators	33	67
Cooks	33	67
Owner	22	45
Managers	17	35
Other	1	2
I don't know	2	4

[1] Other include Board of Directors, Staff updated only and Canada Food Guide for Professionals

Table 4.3 Items of the adapted Level of Institutionalization Scale and responses

Domains	Items	No		Somewhat		Yes		I don't know	
		n	%	n	%	n	%	n	%
	My child care centre's food and nutrition policy…								
PR	*include goals and objectives*[1]	15	36	11	26	14	33	2	5
SP	*became a part of the day to day practice at our child care centre*	2	5	4	10	35	83	1	2
	My child care centre…								
MG	*has a description of staff responsibilities when it comes to implementing our food and nutrition policy*	8	19	13	32	20	49	0	0
PR	*has a written schedule for implementing our food and nutrition policy*[1]	9	22	11	26	22	52	0	0
MT	*has assigned responsibilities to staff when it comes to the implementation of our food and nutrition policy*	7	17	8	19	27	64	0	0
MG	*has assigned supervisors to coordinate the implementation of our food and nutrition policy*	10	24	7	16	23	55	2	5
PR	*has established plans or procedures for implementing our food and nutrition policy*	2	5	11	27	28	68	0	0
PR	*has evaluated the implementation of our food and nutrition policy*[1]	4	10	15	38	19	49	1	3
PR	*has modified available best practice recommendations in your nutrition policy to meet the needs of our child care*[1]	6	14	12	29	23	55	1	2
SP	*has set aside financial resources (money) to continue the implementation of our food and nutrition policy*	7	17	11	26	20	48	4	9
SP	*has set aside human resources (people) to continue the implementation of our food and nutrition policy*	13	32	9	22	17	41	2	5
SP	*has set aside physical resources (space) to continue the implementation of our food and nutrition policy*	9	21	5	12	26	62	2	5

SP	*has set aside resources to ensure training for staff to continue the implementation of our food and nutrition policy*	10	24	10	24	19	45	3	7
SP	*has the required infrastructure (for example, resources and equipment) for implementing our food and nutrition policy*[2,3]	5	12	11	26	26.2	62	0	0
MG	*has written evaluation reports of the implementation of our food and nutrition policy*[1]	23	57	6	15	9	23	2	5
	Have child care …								
MT	*directors and/or managers actively encouraged the implementation of your child care centre's food and nutrition policy?*[2]	0	0	5	12	35	85	1	3
MT	*staff, other than those responsible for implementing the food and nutrition policy, also contributed to the implementation of your child care centre's food and nutrition policy?*	10	24	15	37	13	32	3	7

PR: Production system; SP: Supportive system; MG: Managerial system; MT: Maintenance System
Cronbach alpha = .89
[1] Statistically significant difference in the proportion by child care administrator education level, Kruskall-Wallis (P <.05).
[2] Statistically significant difference in the proportion by child care years of operation, Kruskall-Wallis (P <.05).
[3] Statistically significant difference in the proportion by child care administrator years of experience, Kruskall-Wallis (P <0.05).

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5 "Policy is there, the Routine is there, the Structure, All You Need is to Drive": A Multiple Case Study of the Implementation of Administrative Food and Nutrition Policies in Child Care Centres.

A version of this paper will be submitted for publication. Lima do Vale, M. Farmer, A. Gokiert, R. Ball, G. Maximova, K.: "Policy is there, the Routine is there, the Structure, All You Need is to Drive": A Multiple Case Study of the Implementation of Administrative Food and Nutrition Policies in Child Care Centres.

5.1 Introduction

Service level or administrative food and nutrition policies (FNP) are the written rules or principles adopted by child care centres to ensure that the nutritional needs of children are met while in child care centres[1]. There is an expectation that administrative FNP should facilitate the translation of regulations and standards into child care day to day practices, and the creation of consistent practices among child care providers [1–3]. Administrative FNP are also becoming common among child care centres in developed countries[2,4–6].

The evidence supporting the effectiveness of administrative FNP in guiding consistent evidence-informed practices in child care centres, however, is still lacking. For instance, previous studies with child care centres in Australia and the United States have shown that administrative FNP are not reflective of national and international guidelines for child feeding [2,3]. Additionally, studies in the United States found no association between the child care centres' FNP and providers' practices regarding the beverages served [7], and only weak associations between the centres' FNP and providers' mealtime practices (e.g., role modelling, nutrition talks at meals and consumption of unhealthy foods) [8]. Similar results were also reported in preschools in Ireland, where the existence of administrative FNP on healthy eating did not influence providers' practices[6].

Translating FNP to practice is a complex process that deserves further understanding. Several factors across various socio-ecological levels (e.g., policy, individual, organization, community, and system) might affect the success of implementation efforts, as described in many theories, models, and frameworks used in implementation research [9]. However, previous

studies have only minimally started to examine the factors affecting the implementation of FNP in child care centres. For instance, one qualitative study in Australia described barriers at the policy level, such as the use of technical language, lack of detailing and orientation, and passive communication of rules [3]. Furthermore, surveys in the USA, New Zealand and Canada have pointed to barriers at the individual and organizational level, including providers' lack of awareness of policies in place, lack of knowledge and skills to perform recommended practices (e.g., creating positive mealtime environments), and limited access to required resources [7,10,11]. Findings from previous systematic reviews exploring the implementation of nutrition guidelines in child care centres [12] and nutrition policies in schools [13] suggest that there might be additional factors constraining FNP implementation in child care centres that remain unexplored.

A case study was considered an appropriate design for this study, as it enables the generation of rich information about FNP implementation in child care centres' natural contexts [14] within organizational boundaries and dynamics. Compared with previous studies that used survey designs, case studies present the advantage of allowing implementation factors to be better understood and described. In addition to that, multiple case studies are often considered stronger than single case studies[14] and allows for understanding differences in child care centres FNP implementation.

5.2 Objectives

The current study aimed to describe factors affecting the implementation of administrative FNP across three urban child care centres with varying levels of implementation. The Promoting Action on Research Implementation in Health Services (PARIHS) [15] was used to frame the research questions and analysis.

5.3 Methods

Study Design

This qualitative multiple case study [14] was conducted from February 2019 to February 2020. This manuscript presents the results of the second and final stage of a sequential, mixed-

methods[16] study. The first stage included a cross-sectional, web-based survey that helped to identify potential cases (child care centres) for this second stage. Survey results are described elsewhere (please see Chapter 4).

Selection of the Theoretical Approach

In descriptive case studies, theory plays an important role in providing a framework for data collection and interpretation while managing the scope of the study [14]. The selection of the theoretical framework used in this study was informed by a mapping exercise that consisted of matching frameworks identified in our previous scoping review (Lima do Vale et al., 2020) to factors identified in previous studies aiming to implement or evaluate FNP implementation in the child care setting. This mapping exercise showed that the majority of the factors described in previous studies were aligned with PARIHS elements, PARIHS has been previously used in qualitative studies in the child care setting, and PARIHS provided a set of interview questions that could be used to inform an interview guide.

Study Sample

The screening of potential cases occurred in the first stage of this research. The Implementation of Nutrition Policies in child care Survey (INPC-S) was used to identify the cases. The sampling strategy (extreme or deviant sampling) aimed to identify cases that would provide insights on factors that would explain both successes and challenges [17]. As such, only centres that had achieved scores >75th percentile and <25th percentile in the INPC-S were considered. Achieving a high score meant that the centre was a high implementer and had established resources (e.g., human, financial, and structure) and processes (e.g., plans, support, and evaluation) to secure FNP implementation. On the contrary, a low score or low implementer meant the absence of one or more of the resources and processes previously listed. Invitation letters were sent to all centres (n=8) within the top and bottom quartiles. Three of them (two from the top rank and one from the bottom rank) agreed to participate in the case study. Following case identification, a formal consent process was completed with child care owners

and/or directors. Owners and directors provided information letters and verbally notified the child care providers about the study (See Appendices K and L).

Data Collection

This case study approach relied on participants' verbal reports of the implementation process. Document reviews (FNP, weekly menus, daily routines schedule, job description and performance evaluation) were also performed. Except for the FNP, additional documentation was only requested of centres when child care providers referred to them during the interview.

The PARIHS informed the development of our interview guides. All questions were tailored to participants' roles in the child care centre. The interview guides were also reviewed by trained qualitative researchers (n=3), after which minor changes in the sequencing and wording of questions were made. Interviews were conducted by the principal investigator (MLV), face-to-face, in a quiet and private room at the child care centres. In case of interruptions, interviews were paused and only resumed when privacy was re-established. Interview length ranged from 21 to 51 minutes, with an average of 33 minutes. At least six child care providers were interviewed from each child care centre, including owners, directors, educators, and cook(s). Within cases, data collection ended when all interested child care providers were interviewed.

Participating centres received a $100 visa gift card and individual participants received $25 visa gift cards as an appreciation for their participation. This study received ethics approval number Pro00087972 from the University of Alberta Research Ethics Board. Participant recruitment only started after ethics approval was received.

Data Analysis

Each child care centre was considered a case in our analysis. Framework Analysis[18] was employed to analyze the data within and across settings. The Framework Analysis allows for deductive coding (i.e., using pre-defined codes informed by an existing theory), but also encourages some open coding to ensure important aspects of the data are not missed [18]. The

primary output of Framework Analysis is a matrix with columns (representing codes) and rows (representing cases), which facilitates reading across cases and comparing cases by code [19]. Framework Analysis also provides a transparent, robust way to synthesize qualitative data without losing the context of participants [20]. When compared to the other deductive or codebook approaches used for thematic analysis (e.g., matrix and template analysis), Framework Analysis provided more clear steps for the coding and matrix development processes.

As the first step of data analysis, all recordings were transcribed (by MLV), which enabled immersion in the data. Two trained volunteers (senior undergraduate students) listened to the audio recordings while reading the transcripts simultaneously to check for errors or inconsistencies. Transcripts did not account for pauses, interruptions and nonverbal communication.

A codebook was developed by the principal investigator (MLV), who also completed the coding. The codebook drew on elements from the PARIHS framework. Coding began by organizing sentences and paragraphs into pre-established themes (e.g., innovation, recipients, and context) and codes (e.g., degree of fit, knowledge and skills, leadership support, and regulatory frameworks), which were derived from the PARIHS framework. Text that could not be assigned to any pre-determined code was analyzed later to determine if it represented a new area. Additional codes also emerged from the data. After coding the first few transcripts, the principal investigator (MLV) had a debriefing session with the research supervisor (AF) to discuss the codes and reflect on alternative possibilities. Using an iterative process, further transcripts were coded, which were compared to existing codes that were refined and finalized. The final codebook was completed when all relevant text was assigned to a code (Please see appendix Q for a copy of the codebook). Following the coding process, the data were charted in a matrix. After the development of the matrix, characteristics of and differences between the cases were identified. To facilitate tracking the applicability of the PARIHS to the child care context

and improve the usability of our findings, results were organized in terms of innovation, recipients, local and organizational, or external systems level [21] of the PARIHS framework. *QSR NVivo 10* (QSR International Pty Ltd. Version 12, 2018) was used for data coding and analysis. In addition to that, the content of the FNP was further evaluated guided by a standardized evaluation template [22].

5.4 Results

Case Descriptions

Three urban child care centres participated in this study: the profit (i.e., individual owner-operated centre); the franchised (i.e., centre operated by a larger national chain); and the non-profit (i.e., centre operated by a board of directors). All cases were located in urban areas and were medium-sized. Table 5.1 presents a more detailed description of the cases.

Case #1: The profit centre was considered a high-implementer as they reported all 17 resources and processes included in the survey (see appendix J for all items). This was a new child care centre (<1 year). About half of the providers, including the owner and director, had little experience in their roles (<1 year). The FNP were developed by the owners. FNP was comprehensive but lacked detail and strength.

Case #2: The franchised centre was also considered a high-implementer as they reported 15 of the 17 resources and processes included in the survey. This centre was also fairly new (1 to 5 years). About 83% of providers, including the owner and director, had some experience in their roles (1 to 5 years). The FNP were developed by the head franchisor. The FNP were relatively narrow but had moderate details and strength.

Case #3: The non-profit centre was considered a low-implementer as they reported 10 of the 17 resources and processes included in the survey. This centre was well-established (>10 years). About 67% of providers, including the director, also had some experience in their roles (1 to 5 years). FNP were developed by the previous director and reviewed by providers and the board of

directors (including parents) before being published. The FNP were also narrow but had more detail and strength than the other centres.

The survey indicated a few important differences in FNP resources, processes and implementation between high and low implementers (e.g., FNP became part of the culture, included goals and were evaluated). However, information collected during the case study sometimes contradicted survey responses, and the differences in FNP implementation became less pronounced.

Factors influencing implementation

The results are presented according to the domains of the PARIHS framework, including innovation, recipients, and contexts (local, organizational, and external system levels). Except for policy drivers and priorities, all of the factors described in the PARIHS framework were identified across cases. Two new factors emerged from the interviews (e.g., adaptability, and knowledge and skills acquisition), which were not part of the PARIHS framework.

Innovation

Table 5.2 presents the *innovation* theme, which relates to the characteristics of the innovation (i.e., FNP) that affect its uptake. All cases mentioned many *relative advantages* of FNP and potential *observable results* of policies on parents' selection of child care centres and children's diets and behaviours. The profit centre described FNP as a need, not only as an advantage. Having a rationale or FNP informed by credible *underlying knowledge sources* seemed to influence FNP acceptance. There was also a perception, among all cases, of some *adaptability* in the FNP, with strict policies being better accepted in the context of children's safety, as described by the non-profit case. On the other hand, all cases illustrated examples where the *degree of fit* between FNP and providers' preferences and capacities or parents' cultures was low. For instance, the profit cases highlighted that complying with FNP could become difficult for providers with limited experience in child care. There was a lack of *clarity* on what FNP were, which was common across all cases. Often, FNP were perceived as the

observed set of food and nutrition practices in place instead of the set of formally written policies. Cases differed in terms of *usability*. Although policies were made accessible to providers in the staff's room across all cases, there were differences regarding FNP level of detail and 'how-to' guidance. The non-profit case mentioned *trialability* in the context of testing the menu's acceptance and modifications.

Recipients

The *recipients* theme (Table 5.3) describes whether all individuals who might support the innovation want and can implement it, which in our study encompassed child care providers and their perceptions towards parents. In terms of commonalities, providers showed high *motivation* to follow FNP, yet the extent of their motivation varied depending on the policies' content (e.g., more committed to safe food handling practices than the nutritional quality). Providers also had the perception that parents were not as committed to providing healthy foods for their children, which created difficulties in maintaining continuity between the child care centre and the home environment. The influence of recipients' *values and beliefs* was another factor common across cases. For instance, the profit case mentioned that parents' preferences might prevail over the centre's policies. In addition to that, all cases further mentioned the *presence of boundaries,* either semantic (e.g., different interpretations) or pragmatic (e.g., different perspectives), that constrained FNP implementation. Additional difficulties encountered across cases included the lack of *time and resources (budget),* which *con*strained compliance with FNP and plans. It was also mentioned that parents' limited income could be a prohibitive factor for compliance. Moreover, *knowledge and skills* also seemed to have affected providers' performance, in both positive and negative ways. For instance, the franchised case mentioned that the previous cook did not have the knowledge and skills to prepare foods for a large number of children. Providers in the profit case raised the concern that nutrition knowledge and skills were not valued by educators, only by the cooks. In all cases, providers reported a preference for more practical approaches in terms of *knowledge and skills*

acquisition. Except for the director in the non-profit case, all child care providers interviewed have not had any training in nutrition. In terms of facilitators, providers in all cases talked about having supportive *existing networks* and demonstrated strong *collaboration and teamwork*. For instance, providers mentioned exchanging knowledge with friends and receiving support from their peers. They also talked about efforts towards building consensus. Additionally, it was found that *local opinion leaders* (e.g., room leads, directors or more experienced providers) were important in disseminating policies and practices to new providers.

In terms of differences, the *goals* of providers in terms of food and nutrition varied across cases. Although it was a common aim to provide healthy and safe foods, the profit case talked about providers' role in nutrition education and the non-profit case talked about the promotion of positive relationships with foods. Another difference, and it seems of crucial importance, was the *power and authority* given to providers in terms of enforcing centres policies. Whereas in the profit case the parents seemed to have greater power over the centres policies, in the franchised case, providers were enforcers of the policy.

Local and Organizational Level

Context is a construct in the PARIHS that represents the micro, meso, and macro levels, that enable or constrain implementation. At the local and organizational level, *senior leadership and management supported* FNP implementation and/or evaluation across all cases. *Mechanisms for embedding change* were also similar. In all cases, providers were required to read the binder of policies once they started in the job. Child care centres were also spaces for learning. Staff meetings enabled *learning networks* and gave opportunities for providers to create and exchange knowledge. Child care centres further supported providers learning, although to different degrees. The profit case provided workshops and webinars at the centre, which created more convenient *learning environments*. Nutrition, however, was not a topic included. In all cases, there were also *structure and systems* that supported internal and timely communication, including instant messaging groups and information boards.

Many differences in terms of organizational context were described. In all cases, *formal and informal leadership support* was essential for providers. Support was either structural (e.g., resources and extra providers helping during meal time), morale (e.g., directors believing and supporting educators' capacities), or emotional (e.g., "mental breaks" from work or comforting words). But, the types and level of support varied across cases. The extent to which leadership reinforced policies varied as well. The profit case used a more active approach where the director created and displayed policy "memos". Another difference apparent from the cross-case comparison was the degree to which owners and directors were open to making changes in policies, and the degree that they sought providers' engagement, and created a *culture* supportive of innovation. Although all cases encouraged providers' input, the franchised case used more intensive engagement strategies (e.g., shared decision making and accountability). *Absorptive capacity* for policy innovation also varied. All cases, except the franchised, mentioned proactive behaviours to assess satisfaction with policies. Similarly, the *history of innovation and change* also varied across cases. Except for the franchise case, the other cases have experienced changes in policy, which were mostly motivated by emerging issues. For the non-profit case, moving from familiar to new practices was hard for providers. Although in all cases providers described being constantly observed and evaluated, the approaches for providers evaluation were also different. In the non-profit case, providers had more clarity on the criteria being assessed. In terms of *organizational priorities* related to food and nutrition, the profit case had more comprehensive aims. According to their FNP, their objective was not only to provide healthy foods but instill healthy eating behaviours, which was also expressed by one provider at the non-profit case, yet to a lesser extent.

External system-level

The outer context refers to the wider system in which the child care centre is based, including the policy, social, regulatory, and political infrastructures that either facilitate or constrain policy implementation. In general, cases did not differ much in terms of external

system-level factors, except *for inter-organizational networks*, which varied across the different organizational structures (profit, non-profit, franchised). Being connected with other organizations allowed centres to acquire and exchange knowledge on regulations, functioning, food, and nutrition practices. In terms of similarities, existing *regulatory frameworks* in Alberta contributed to policy development and/or evaluation. Moreover, g*overnment incentives and mandates,* including participation in accreditation systems, provided further stimulus for policy implementation. But the lack of government support and funding for child care negatively affected centres capacities and could limit compliance with nutrition standards. The quality of environments that can be provided and FNP implementation was connected with *environmental (in)stability* elements, such as availability of skilled child care providers in the market, staff turnover/retention and income of enrolled families.

5.5 Discussion and Conclusion

The purpose of this study was to describe factors affecting the implementation of administrative FNP across three child care centres (profit, franchised, and non-profit). According to the PARIHS framework, which guided this study, factors located at the i) innovation, ii) recipients, and iii) context influenced implementation. As presented in Table 5.2, almost all of the factors described in the PARIHS were salient to FNP implementation in child care centres, with a couple of additional factors emerging from the data (e.g., adaptability, and knowledge and skills acquisition). In terms of innovation, lack of clarity on FNP, and the limited degree of fit and usability were important barriers. FNP implementation was further constrained by recipients' low commitment (specifically parents), knowledge and skills, and providers' power and authority to enforce policies. The greater differences across cases were in terms of local and organizational contexts, particularly in culture, absorptive capacity, and leadership support. Although mechanisms to embed and evaluate FNP implementation were in place, they lacked focus on FNP. Government regulatory frameworks and incentives had an

important role in FNP development and implementation. Although each theme will be separately discussed below, in reality, the boundaries between these factors are not rigid[23] – innovation, recipients and contexts do not have stable attributes, they interact in a complex manner and determine implementation success[24].

Innovation

Our findings showed that FNP were well accepted when they were perceived to lead to improvements in practice and outcomes (relative advantage and observability), were informed by credible formal and practical sources (underlying knowledge sources), and were aligned with recipients' preferences and capacities (degree of fit). However, these factors were not always supportive of FNP implementation across cases. Across all cases, providers did not have clarity on what FNP were (e.g., FNP were often understood as the child care centre's menu) or what they encompassed (e.g., providers did not often remember FNP' content), which was also identified by other studies in the United States and New Zealand [2,8]. Examples highlighted a low degree of fit between policies and recipients' preferences and capacities. Previous studies have suggested that fit between innovation and recipients and organizations is related to better attitudes (e.g., commitment) and behaviours (e.g., assimilation) towards the innovation[24,25]. Randall and Nielsen [26] proposed a model where innovation fit is not only influenced by recipients and organizations' characteristics, but also by implementation activities (e.g., assessments and participatory processes). Systematic reviews have shown that parental engagement is a key component in effective interventions in the child care setting[27]. More engagement of providers and parents in FNP development and implementation might be the key missing ingredient to address issues related to clarity and fit and improve FNP implementation in child care centres.

Across and within cases divergent results emerged regarding the FNP level of detailing to guide practice (usability). Although previous literature has suggested that detailing FNP procedures could increase providers' knowledge and support quality practice [3], one educator in

the non-profit case described that too much detailing or 'how to' in FNP would limit providers' room for adaptations or refinements. This idea of allowing providers to take core concepts from FNP and create their strategies to implement such concepts in practice, yet not included in the PARIHS, is aligned with the construct of reinvention/fuzzy boundaries proposed by Greenhalgh [24] or adaptability proposed by Damschroeder [28]. As such, it might be important to delineate the core and flexible aspects of FNP. Using clear and strong language to indicate rigid boundaries might be needed during policy (re)development stages [29]. Besides, providing sufficient information seems to be important so FNP can serve as an educational resource for providers and families [3].

Recipients

The use of the PARIHS framework supported this study in identifying a range of factors at the recipient level that matter for FNP implementation. The majority of factors identified at this level were overall quite similar across cases and reinforced some factors identified in previous studies related to the implementation of nutrition interventions (including, but not limited to FNP) in the child care setting, for example, clarity of what FNP are[6], goals and motivation[30,31], nutrition knowledge and skills [32], training in nutrition[33], preferred strategies for knowledge acquisition [34], budget and time [31,32,34], and networking and collaboration [35]. There was a sense of responsibility towards children's food and nutrition and motivation to follow FNP, which could facilitate FNP' implementation. However, perceived responsibilities were not always aligned with FNP's aims. In two of the cases, educators felt it was not part of their responsibilities to be aware of FNP. Although only explored from the providers' perspectives, there was some indication that not all parents were committed to follow FNP or provide healthy options for their children. Parents' compliance with FNP was also limited by budget and time, but were also related to semantic (e.g., not understanding the content of FNP recommendations) and pragmatic (not understanding the point/value of FNP recommendations) boundaries, that could be overcome with increased engagement of parents in policy development. Having food

and nutrition knowledge and skills supported FNP implementation, particularly in terms of recommendations regarding menu planning, food preparation, and mealtime practices. However, providers often lacked training in food and nutrition. Child care providers in this study preferred more practical and/or experiential learning approaches to acquire knowledge and skills. As such, practice-oriented webinars, existing networks, and opinion leaders (e.g., directors, room leads, and experienced providers) were often the main channels used to learn new desired practices. In addition to that, providers were invested in establishing consistent practices and were highly engaged in collaboration and teamwork efforts. As such, ensuring that information shared/modelled by providers, particularly by opinion leaders, is aligned with FNP can be crucial in translating policies into practices, as supported by one recent systematic review [36].

One difference that stood out from the cross-case comparison was related to providers' power and authority to enforce FNP across cases. In the profit case, for example, not only the policy lacked strength but providers also lacked authority to enforce policy (compliers). On the contrary, in the non-profit case, the policy was more authoritative, which supported providers' roles as enforcers of the policy. Similar issues were also presented in the study of Jennings [6].

Local and organizational context

Interest in organizational factors affecting the implementation of innovations in the child care setting has grown in recent years. Our results corroborate previous findings that supporting organizational structures and processes[35] and formal and informal leadership support [4,35] within child care centres are essential for the implementation of innovations, such as FNP. Organizational characteristics were supportive but required improvements to ensure FNP implementation. For instance, owners and directors were invested in FNP implementation and created formal mechanisms to promote providers' awareness. However, mechanisms in place (one-time exposure to all policies) did not guarantee providers' awareness of FNP, as described before. In addition to that, constant monitoring and feedback were also in place, but, in the

profit case, for example, it was not clear if the aspects being evaluated were aligned with FNP. In addition to that, even though all cases offered opportunities for providers learning, including networks (e.g., staff meetings) and learning environments (e.g., conferences, workshops, webinars), which could increase nutrition knowledge and skills and therefore facilitate FNP implementation, food and nutrition were not often discussed. Limited training in nutrition is often reported in the child care setting [2,3,10]. To address this common issue, it has been suggested that nutrition should be considered mandatory for the education of child care professionals [34], which is not currently the case in Alberta.

Cases also differed in terms of *absorptive capacity, past experiences with change,* and some aspects of the *culture*. For instance, the franchised case was not as invested as the others in actively evaluating and improving FNP, and had not changed FNP. Less absorptive capacity might translate in centres being less able to identify when improvements in FNP are needed, despite being open to changes in FNP. In terms of culture, the franchised case used more empowering strategies (e.g., shared decision making and accountability) to engage providers. Engaging recipients in policy and practice decisions have the potential to close many gaps previously described (e.g., clarity and fit) [1,37]. As providers and families enrolled in child care are from diverse cultural backgrounds where norms regarding what is right or good might be different, having providers and parents' perspectives considered in FNP might be essential [3,38]. Participatory processes are encouraged by accreditation requirements for child care centres in Alberta [39]. However, child care providers and parents were not often involved in policy discussions across cases. Considering the high staff turnover and changes in families, discussions regarding FNP improvements have to be an ongoing process.

External system level

Existing licensing and accreditation systems in place in Alberta influenced FNP development and evaluation, which supports previous findings that government enacted policies can shape practices in child care centres. However, as there were differences in opinions

regarding the requirements posed by licensing and accreditation, more explicit directives for FNP might be needed, which could also encourage FNP development across centres that do not have a policy yet [40] and leverage the priority of FNP among centres that already have policies established. For regulations and accreditation systems to be effective, providing resources to support child care centres' compliance might be necessary. For instance, child care centres in this study described financial and human resources constraints to comply with FNP. In addition to that, inter-organizational networks, which can play important roles in capacity building for FNP implementation, were not equally available and accessible to centres. As such, having a centralized hub to create and disseminate professional development, supporting and networking opportunities might benefit organizational processes required for successful policy implementation in child care centres [41].

This study has many strengths. This is the first study to provide an in-depth and comprehensive description of the implementation of administrative food and nutrition policies in the Canadian child care context. Second, we purposefully sought to interview child care providers from different roles within each centre and collected relevant documents, which allowed for source and methodological triangulation. Ultimately, the selection and operationalization of the PARIHS were clearly described, which increases the transparency of our processes and interpretations. Despite our study strengths, we acknowledge some limitations. First, we aimed to provide interview transcripts to participants for member checking but only nine participants agreed to receive the transcripts, and only two further confirmed interest after the transcripts were finalized. Second, participants' narratives were often related to FNP as an agreed set of practices versus written formal statements. As such, it might be that additional factors would have been identified if clarity around written FNP was higher. However, the findings presented in this study remain relevant considering that they reinforce previous findings and highlight important gaps that remain relevant for FNP implementation. And finally, we sought to select cases with low implementation scores in an attempt to identify

cases facing the most barriers for FNP implementation. However, the scores range was relatively narrow. Thus, cases did not have great variation in FNP implementation, which affected the extreme sampling strategy. Ultimately, all cases selected were located in wealthy socioeconomic areas and a major city, so it might be that child care centres from lower socioeconomic status or in remote locations face more barriers for FNP implementation than the ones described in this study.

This study described factors influencing the implementation of FNP across child care centres. Our results showed that the implementation of food and nutrition is still suboptimal in child care centres. The main gaps identified include limited clarity of what FNP are, limited nutrition knowledge and skills to perform FNP recommended practices, providers' lack of power and authority to enforce FNP, and limited alignment between FNP' aims and organizational mechanisms in place to embed and evaluate FNP implementation. Government incentives and inter-organizational networks would further support FNP' implementation.

Table 5.1 Case Description

Case	Description
#1 The for-profit centre	*Sociodemographics: t*he owner (n=1), director (n=1) and educators (n=6) were interviewed. About half of the participants were 20 to 29 years (n=4) and had less than one years' experience in child care (n=4). Majority had a bachelor degree (62.5%; n=6) and were South Asian (62.5%; n=6). *Context:* this case a medium (75 children) profit child care centre that has been operating for less than 1 year. The age group of children attending range from less than 1 to 7 years. During the data collection, the child care centre was at the later stages of the process of accreditation. *Food and Nutrition priorities:* the owner reported in the survey that providing healthy foods, safe eating environments, supporting healthy food choices and guiding families were very important and of high priority for the centre. *Familiarity with resources:* the owner reported in the survey that she was extremely familiar with the licensing and safety requirements, and very familiar with the Canada Food Guide and ANGCY. *Food and Nutrition Policies*: this case received the best score on the INPC-S (All 17 resources and practices were in place). FNP were developed by the owners before the child care centre opened. The FNP in this centre is broad, but lack detail and strength – they included 31 statements about i) nutrition standards (n=13), ii) meal environments (n=7), nutrition education (n=7), and iv) communication and evaluation (n=4). Of those, 11 (35%) were detailed and strongly worded.
#2 The franchised centre	*Sociodemographics:* The owner (n=1), director (n=1) and educators (n=4) were interviewed. The majority of participants were 20 to 29 years (66.7%; n=4) and had 1 to 5 years' experience in child care (83%; n=5). About half had a university certificate (n=3) and were Canadian/European (n=3). *Context:* the second case is a medium (82 children) profit franchised child care centre that has been operating from 1 to 5 years. The age group of children attending range from 1 to 7 years. During the data collection, this child care was at the early stage of the accreditation process. *Food and Nutrition priorities:* the director reported in the survey that providing healthy foods and safe eating environments were very important and a priority for the centre. Whereas supporting healthy food choices and guiding families were somewhat important and of medium priority. *Familiarity with resources:* the director reported in the survey that she was very familiar with the licensing and safety requirements, and with the Canada Food Guide. She was slightly familiar with the ANGCY

	Food and Nutrition Policies: this case received the 2nd best score in the INPC-S (15 out of 17 resources and practices in place). FNP were developed by the master franchise and shared with the franchisee. The FNP in this centre is more focused but moderately detailed and strong – they included 16 statements about i) nutrition standards (n=11), ii) meal environments (n=3), nutrition education (n=0), and iv) communication and evaluation (n=2). Of those, 9 (56%) were detailed and strongly worded.
#3 The non-profit centre	*Sociodemographics:* The director (n=1), cook (n=1) and educators (n=4) were interviewed. About half of the participants were 30 to 39 years (n=3), had a bachelor degree (n=3), and were South Asian. The majority had 1 to 5 years' experience in child care (66.7%; n=4). *Context:* the third case is a medium (80 children) non-profit child care centre that has been operating for more than 10 years. The age group of children attending range from <1 to 5 years. This child care was already accredited. *Food and Nutrition priorities:* the director reported in the survey that providing healthy foods and safe eating environments were very important and of high priority for the centre. Supporting healthy food choices were also of high priority, but only somewhat important. Guiding families were somewhat important and of low priority. *Familiarity with resources:* the director reported in the survey that she was extremely familiar with the licensing, but only slightly familiar with safety requirements, Canada Food Guide and ANGCY. *Food and Nutrition Policies*: This centre got the lowest score in the INPC-S (11 of 17 resources and practices in place). Current FNP were developed in 2015 by the director at the time. Previous FNP had been lost during changes in management. FNP were reviewed by staff and board of directors before being published. The FNP in this centre is narrow, but detailed and strong – they included 18 statements about i) nutrition standards (n=12), ii) meal environments (n=3), nutrition education (n=0), and iv) communication and evaluation (n=3). Of those, 13 (72%) were detailed and strongly worded

Table 5.2 Characteristics of the FNP (innovation) affecting implementation

Codes	Illustrative Quote
Common factors	
Relative advantage	"Having a policy is making sure everyone is on the same page. Everybody follows what is best and safe for the kids" Case 1 – Director "We wanted to have a menu onsite, cooked on site, in order for us to deliver that, in order to us, like being efficient, we need to have food and nutrition policy." Case 1 – Owner "Food related policies are really important if there is an in-house cooking or kitchen done for this big numbers of kids." Case 2 – Educator 3. "The policy like I said it outlines all that stuff, it's important to have it on paper, because if it's just in the air, what can we refer to, I guess that's what I was trying to say. " Case 3 – Educator 3.
Observable results	"The children should get a balance diet when it comes to their food, even though they are in the centre, not at home" Case 1 – Educator 6. "If we didn't provide healthy food or didn't follow the food guide I just feel like children would be sick or it wouldn't be as a happy place, children will be grumpy because they'd be more hungry all the time." Case 2 – Educator 1 "I believe that's one of the reasons why parents are bringing their kids here, they don't have to pack lunch, they don't have to pack snacks, right. So as long as we have - followed the policy in here, we believe that we will be successful in like, taking care of this children, providing them healthy meals." Case 3 – Director
Underlying knowledge sources	"In the practical way I think the policies of our daycare is following, is all according to the Alberta regulations and whoever have made those things might be very very experience and, the people who know that these things will works practically." Case 1 – Educator 2. "And that they (providers) would explain why it was not allowed, so there was a reasoning behind it, such as if a parent sent cupcakes, other children would see it and refuse lunch and ask for cupcakes, which would make the situation a little chaotic" Case 2 – Director "Our menu has been looked by a nutritionist, we based this menu from accreditation standard, we based this menu from the licensing". Case 3 – Director.
Clarity	"There is a policy, the nutrition policy, like a provincial thing, is it uniform or each daycare, each daycare" Case 1 – Educator 4 "I have read it once, but I don't remember, it's time to review again" Case 1 – Educator 5

	"I don't really remember what it says in the book because that was a year ago but from what I've seen I like it and I feel like the food and nutrition is good here compared to what I've seen or heard from other centers." Case 2 – Educator 1 "A little bit not really too much because I'm not a cook, right? So, I know what the kids need to eat if they're allergic too we don't give them that - those kind of foods" Case 3 – Educator 4
Degree of fit	"It's difficult to compare our system with their culture and be pushing it to accept" Case 1 – Director "I think for the staff it is easy because they are coming from, they have experience already, with different day cares, they are working for so many daycares. Easy for the parents because they are the one who is actually feeding their kids and then also cooking for them. But when it comes to a people who just moved in, to a new city, it is tricky. But, they usually this it is, okay" Case 1 – Director. "A couple of parents didn't agree, they didn't understand, they'd argue" Case 2 – Director "I've seen centres where I didn't agree, I just knew it wasn't a centre I wanted to be part of" Case 2 – Educator 2 "Here we follow the nutrition policy, we follow the Canada guide, she will provide healthier options, and if the kids are not aware of those, are not used to those, it's hard for the kid to grasp it." Case 3 – Director "Sometimes it's not being followed, because some kids eat more and it's hard to say no, I give more than Canada Food Guide recommends" Case 3 - Educator 1
Adaptability*	"I think we are doing 90% of that, some of the times we are going here and there, applying our own rules, just to make the things work out better, other than that, yes" Case 2 – Educator "I have the freedom to do what I want as long as I am providing those certain food groups" Case 2 – Director "If they want to introduce their own, they are more than welcome, as long as children are getting what they need, whatever information and practices they need" Case 3 – Director "I think it's quite strict to be honest which I understand because we file – we, if you see our allergy list it's quite a lot so we don't want any kind of allergic reaction" Case 3 – Educator 1
Distinct factors	
Usability	"I do not see any in my career, any policy, nutrition policy who is very detailed about how to deliver it, how to deliver such policy to another person, either it is parent or staff, it is very common, okay if this is a food, this what you get benefits from, this is when you get it. That said simple." Case 1 – Director "I do like that our policy does have a lot of recommendation because anytime I have families who struggle with, they bring treats because treats (…) I can kind of copy and paste that policy" Case 2 – Director

	"How does the policy guide us? To be honest the policy doesn't really guide me that much. I just know in my brain that they should be given. So it just kind of kind of gives me an idea OK this is what I should give to you" Case 3 – Educator 1 "It's more clear, it says how we will implement" Case 3 – Director
Trialability	"You just explore throughout your work with such situation, so when you are working with kids of course in these four years I try the strategies and then it does not work out so we switch it and tried a different one" Case 1 – Director "I think there are some things that you just have to see how a child responds to, some children don't learn from, don't respond well to what another child, so you just have to get to know your kids and you just see what works, and when you observe other teachers you see what works for them and not everything that works for them will work for you, and then you just have to play around with that and figure out what what's effective" Case 2 – Educator 4 "We tend to see the pattern, when there is something like a trend in there, we follow this menu and some of them get will used to it, and then there's no taste the first time we put it out, like we didn't put anything, we just boil them and then kind of fried a little bit. The second time we kind of put sugar in it, we boiled them, and put like sugar in it, and put in the oven, caramelized it. Some of them like it better. Then the next time, I was like, ok, maybe we can like mash it, to make it softer. So we are just, "what do they want?", we experiment, "do you want this better", right" Case 3 - Director

*Factors not embedded in the PARIHS framework

Table 5.3 Characteristics of the recipients (providers and parents) affecting implementation

Codes	Sub-codes and Illustrative Quote
Common factors	
Motivation	"Whatever we put in policy, we make sure, whatever or however, we should provide four food groups, not like, we do not have money to spend" Case 1 – Director "Whatever policies and procedures we have, and whatever regulations we have, we try to follow that, we try to follow this for our director" Case 1 – Educator 2 "Some parents they don't care, they don't even ask" Case 1 – Educator "My staff make sure policies are followed, some are a little bit more strict, they all care about, it is known, specially allergies, they are very aware, but when it comes to junk, not as much" Case 2 – Director "Some parents bring junk, to kind of get them (children) in the centre, it's a tactic maybe, if they aren't concerned about their child, let us feed them" Case 2 – Educator 4 "We are trying our best, but then there is a parent that just want continuity home" Case 3 – Director
Time and Resources	"Parents who are facing a low income, cannot provide those kinds of nutritious foods, fruits and vegetables are expensive, they are more into processes foods" Case 1 – Director "I feel when the menu is repeated, when they are short on budget, they will keep getting the same thing for two or three days, and kids are not eating well" Case 1 – Educator 2 "Even with the chicken nuggets, were supposed to be homemade, that's not homemade, because it's time consuming, the time it takes to make them is a big factor" Case 2 – Director "If you have to make pancakes or waffles, looks like, run run run. I'd feel that pressure" Case 3 – Cook "The policy is there, the routine is there, the structure, all you need to do is to drive" Case 3 – Educator 2
Values and Beliefs	"Parents come from different cultures that affects you, they do not eat food we provided, over here we are more into a more Western kind of foods, compared to people that comes Northeast Asia, they are bringing the same way" Case 1 – Director "Parents don't like processed foods, they do not read a policy or anything, they would be 'no canned foods'" Case 1 – Director "I don't want my kids going to daycare and eating processed foods, we try not to" Case 2 – Owner "I think it's just probably my childhood because we have also like a very strict eating habits at home because of my family, my mom (talking about influences on his mealtime practices)" Case 3 – Educator 2

Skills and knowledge	"It depends on the educator so that children will eat the centre foods, it depends on how you'll motivate them, because I have 4 years' experience, they don't have any struggles from me" Case 1 – Educator 6 "I feel like I don't know that much (about nutrition), just the basics, it should be valued more to educators" Case 1 – Educator 4 "We had other cooks who had been too overwhelmed with the job, they can't handle it. She (the current cook) is very fast, very good, she just seems to know what she is doing, she is just very aware" Case 2 – Owner "(…) flexibility, they (providers) are willing to go outside the box, especially for the cook, what else can you provide? That's their job, provide different kinds of food that are healthy and nutritious" Case 3 – Director <u>Acquisition of knowledge and skills*</u> "In day care is tricky to have training on nutrition, you get knowledge through policies, what the nutrition look like, most f things you learn talking to parents and when you see kids behaviour, we don't have training to tell you, we learn from experiences and practices (…) Some things are common sense, you use a strategy, *oh, it works*, sometimes it's against licensing somehow " Case 1 – Director "Webinars are more useful, they keep updating their knowledge and the practical is, they keep telling us, more useful than books" Case 1 – Educator 5 "It was fun, so you kind of remember, 'we have to serve fruit and something else', it just made easy, but you have to practice every day" Case 2 – Educator 1 "I learn visually, for me, reading sometimes not, when the lead is showing me things, I learn that faster than reading (…) I learn more when I am in the room than reading a paper" Case 3 – educator 1 "Practicum they prepare you, but doing it every day as a job is different than the short time when you are in school. I am aware of all things I had to do because I had done lots of it in school. I'd always think back to those strategies. I try to use mine all the time so I am consistent" Case 3 – Educator 3
Local opinion leaders	"I have learned many things from my staff, they are very experienced staff, this is my first time working, my director, she would always help me if I have any questions I always go to her, talk to her, she tell me "this is how you can do it'" Case 1 – Educator 3 "If we put this in our routine, the new stuff that's coming in like see what we're doing and then they will also follow after that" Case 1 – Educator 1 "Well I'd say it was good to see the different techniques that each teacher uses and learn from them, each person has something different to offer" Case 2 – Educator 4

	"I just agree with her because she is the lead. I kind of 'okay' because she's the lead. She probably knows that better than me or she's been there for a long time so I kind of respect that" Case 3 – Educator 1
Collaboration and teamwork	"We should just have one rule to go through with the kids (…) or they might be confused who to follow. So, mostly after that, after that thing, *Oh I don't think is right* or say after that day we are going to talk about it." Case 1 – E3 "usually discuss it beforehand, how to make it appropriate for the children, for them to do it easily, and usually we all have the same idea at the end, so yeah that's okay." Case 2 – Educator 2 "*I think like this, why do you think like that*, and that we're going to have a discussion and all, because it's like this like this, and then *how about you, why you think like that*, and then that then she's going to say *well that makes sense*" Case 3 – Educator 1 "In my room per se there are different techniques and different strategies (…) some educators have different strategies and sometimes it is frustrating (…) I am bringing in new information and I'm presenting it to my team (…) I'll just keep trying" Case 3 – Educator 3
Presence of boundaries	"No, because parents, I don't think they are going to understand, they want their kids to eat something, they don't care about what other kids are doing and how other teachers are handling it" Case 1 – Director "I have had a couple of parents that have disagreed, and they didn't understand kind of, you know, why they can't bring certain things, are even with the nuts, how they would argue that it doesn't have nuts in it, but in the label it would say like tree nuts" Case 2 – Director "You're bringing them to the daycare, in here, we are providing variety of foods, and that's how we introduce them to the world. That's what I told her (…) So she understands that part, that's when she said "oh maybe it time for me to introduce them to different, to a variety of meals" Case 3 – Director
Existing networks	"Most staff will help you out when you are learning" Case 2 – Educator 1 "(Get information) more from like my friends, because they're also educators as well so we kind of like feed off of each other's like what can we do how to make this work better" Case 2 – Educator 2 "I think the openness of the educated my fellow educators too (facilitated his work). They helped me a lot too, their support really matters as well, because I am definitely, because I am new" Case 3 – Educator 2

Distinct factors	
Goals	"I do have so many responsibilities that are not limited to changing diapers (…) to see that all children are eating well, according to their needs and allergies, they are eating nutritional foods (…) food is important for their brain, they are here 8,9,10,11h per day, it's our responsibilities" Case 1 – Educator 2 "Our goal is to teach them its ok to have a chocolate sometime, but is important to eat healthy food, at this age we want to teach them the different food groups and all" Case 1 – Educator 3 "My role is to ensure that my children are eating healthy foods, there are non-choking hazards, cooked properly in a clean environment, the director is responsible to check, make sure they (providers) are doing it" Case 2 – Owner "Our primary role is safety of the children, ensure children are eating food that is good for their body" Case 2 – Educator 4 "The primary role of an educator is to keep children safe, it's important not just serve them foods, but make sure it's a healthy habit for the children, they have the entire process safe and clean, allowing them to have their own choice, allowing them to respect each other, to keep their foods to themselves and put their foods away when they are done, provide good nutrition in the big perspective" Case 3 – Educator 2
Power and authority	"Parents need their kids to get fed, we are trying so hard, and health inspection comes 'how come you are forcing a child?'" Case 1 – Director "We just have to explain to them, we don't do that, that's not the approach we take, they know we know what we are doing" Case 2 – Educator 4 "If parents tell me *please, force my child*, I'd be like *ok*, what can I do" Case 3 – Educator 2 "If parents ask to bring foods like treat to their children, we would say *no, we don't allow outside food to come in*" Case 3 – Director

Table 5.3 Characteristics of the context (local and organizational) affecting implementation

Codes	Sub-codes and Illustrative Quotes
Common factors	
Senior leadership and management support	"My role is to make sure that policy is in place, policy is being implemented, and if it didn't work out, then we need to change it, so." Case 1 – Owner "So, first is making sure everybody is following the policy. Second, making sure parents are aware what policies we have it and why we have it. And making sure they are following it." Case 1 – Director "As a director, have to make sure that all the policies are always being followed by the staff and by the families" Case 2 – Director "It starts with us, it starts with the management, and how we communicate it to the kitchen, how we communicated to the educator, right? So whatever programming, whatever planning we have, it is with our policy" Case 3 – Director
Mechanisms for embedding change	"We have to sign the thing that we have read these policies" Case 1 – Educator 2 "They also have to read our policies and procedures when they first start with us which has the nutritional policy in it." Case 2 – Director "We spent most of the morning going over paperwork and signing a lot. Reading policies and stuff like that, which I spend a good part of the morning doing, 3 - 4 hours, just doing policies. Because there is a binder full of stuff like that." Case 3 – Cook
Evaluation and feedback processes	"My director is always walking around and telling us "that's good", we get praised pretty frequently but we also get criticized frequently." Case 1 – Educator 4 "The director would come while in the rounds like that, and they kind of observe us, or how our activities are and that kind of feedback comes in, you could do more talking to kids, or keep them engaged those kind of feedback, plus our colleagues, they kind of watch." Case 2 – Educator 2 "They actually recently they have given us a list the actual rubric and specific things that they watch so recently like I've looked over it and I actually I scanned a copy and then I evaluated myself." Case 3 – Educator 3
Learning networks	"I have learned just doing the google online, and talking to my staff and talking to my director, this is how I have learned" Case 1 – Educator 3

	"Aware of this? (responsibilities) By learning it, by reading the policies and we – director is handling meetings, so they keep telling us our responsibilities." Case 1 – Educator 5 "Not yet, we didn't have (workshop on food and nutrition)- but in the staff meetings, we did discuss like, not last meeting, a few meetings back, there was discussion of the Alberta food guide, so there was a discussion about what all things can be included as per the Alberta food guide, and we always have a discussion about the menu" Case 2 – Educator 3 "They (management) make you - they put you into teamwork and give your scenarios when you have to deal with it so it gives you idea on how to you know deal the kids in real life" Case 3 – Educator 4 "I am bringing in new information and I'm presenting it to like my team saying *these are some strategies that we can use*" Case 3 – Educator 4
Structure and systems	"I just put it on WhatsApp, and all the team, especially to our cook, Mr. Cook, *Mr Cook we have this, a student come, and he is vegetarian*, so he knows about it and the educators knows about it. Case 1 – Owner "(…) and then we do have the notice of like nut-free on the parent's board as well, so they are aware that we're nut free". Case 2 – Director "I like how everything is in the information board in the staffroom. If you have any questions usually there is staff meetings and all that stuff. We do have staff meetings too every month, which is good so we can always talk about what's happening what's going to happen" Case 2 – Educator 2 "We have the Hi Mamma and we also have the board outside the room. So those are where we write our activities and everything that happens on them (children) during the day. So, we are always like *hey don't forget to read the board* stuff like that". Case 3 – Educator 2
Learning environments	"They are giving presentation, we are attending webinar, conference to upgrade our education, *these are websites you can read about this*" Case 1 – Educator 6 "The centre is not doing much, that I can say *yes, this centre is doing this*, only they are providing, they have a menu, they are providing nutritional food, but to me, I'm not getting knowledge from that" Case 1 – Educator 2 "We had special trainings from the head office, people come in, they tell us they give us, there was a workshop where we saw visualize the picture or video, and we were trying to brainstorm it, and then do the activities" Case 2 – Educator 3 "Also when Alberta Health provides workshops for nutrition, we tend to go, like, or our educators, because it's free as well, we motivate them to go, and even the cook as well." Case 3 – Director

Distinct factors

Formal and informal leadership support	<u>Motivation and support</u> "Our director (…) keep watching everyone, how we are doing, and sometimes we need help, if some kids are not sitting on the chair, some kids keep playing, so they step in the room and helping us in feeding the kids." Case 1 – Educator 5 "They (management) will keep talking to the families, to the parents, says well *this is the educator, we have hired her, she is very experienced*. So, the families they started to trust me." Case 1 – Educator 2 "They (providers) have been mentored on what to do. So, if they have questions and if they are not familiar with it, they can just ask for help." Case 3 – Director "The management was also very much helpful especially the things that I needed in the room, those are really helpful." Case 3 – Educator 2 <u>Reinforcing</u> "So, we did it every week, we call it accreditation memo. So, she put it in the staff room. One policy, one week." Case 1 – Owner "So, I approach to (the director), and she asked me *did you read the policies and all*, *what does it say,* it says like first take care, which I already did it" Case 1 – Educator 3 "No, not really (reminders of the policy). I mean, we have monthly staff meeting, so if there is anything regarding that (reinforce policy), that we need to bring up, we will" Case 2 – Owner "They'll (management) do like a little reminder on the sticky note if it's something that they already talked to us before and we kind of just forgot" Case 2 – Educator 1 "Even like washing hands, that's the most important and like because kids are getting sick so they told us to wash our hands all the time, that kind of policies they put it there (…) So things like that they put a handout policy because it's important." Case 3 – Educator 6
Culture	<u>Active Engagement</u> "Because sometimes if it is only us who does the thinking it's very stressful too, right? It's good to have like lots of ideas, how do I call this? Input, and it makes you a better team, a better team leader." Case 1 – Owner "I always ask them how they like me to deal with it, do they want to talk to the parent, do they want me to talk to the parent" Case 2 – Director

	"I think they talk to the Cook and ask her if she was okay preparing separate fruit for babies or what her opinions are in adding those foods to the list" Case 2 – Educator 2 "I got a new one (menu) coming up, the director and I are going to sit down and go through what I think is good, what she thinks is good" Case 3 – Cook
	<u>Open to change</u> "And then if they (providers) have something, we are ready to change it." Case 1 - Director "(…) with head office we are able to change it (the policy), but we have to send it over, get it reviewed, and then as long as everything's okay, then yes we can change it, because Alberta's different too than Ontario's" Case 2 – Owner
	"So we like, have to read them (the policies), and if like, staff have any suggestion or any addition to it, we will discuss it, and then if it's right to add in there, we will add them and then update them." Case 3 – Director
Past experiences/ history of innovation and change	"I feel that is not us. So, we are happy that we actually stick with our instinct. There is something going on, why? So, we changed our policy now" Case 1 - Owner "(Has the food and nutrition policy been changed since the opening of the daycare?) No"." Case 2 - Owner
	"We're used to doing this and then another person comes in, *okay we're going to change it* and then *okay* and then another person changed it, *okay then we're going to do this*. So, it's confusing and hard for most of us, I think." Case 3 – Educator 1
Absorptive capacity	"We do have evaluations, we have evaluations with our staff, we have 6 months and we have it one year, during those evaluations we ask them *what do you think of the policies?*" Case 1 – Owner "I haven't had to refer to it or I haven't had to ask too many questions so to me that tells me that it's pretty okay" Case 2 – Owner
	"We just review over and over, if there is an issue from parents, we have to review with staff, *what's going on*?" Case 3 – Director

Organizational priorities	"Aim to provide access to a wide range of healthy foods and support the development of healthy eating behaviours from an early age" Case 1 – Nutrition Policy "I guess the mission of the center is just to provide high-quality care for all children and family (.) So I mean that would involve making sure that they eat wholesome and nutritious meals as well, specially being that we provide lunches" Case 2 – Director "The centre serves snacks and meals that are nutritious, well balanced and take into account the most recent version of the Canada Food Guide and families' and the children's preferences" Case 3 – Nutrition Policy "To take care of children to be a holistic citizen in the future. So, like with that holistic alone, that entails everything like, their development, the environment, what they eat" Case 3 – Director

Table 5.4 Characteristics of the context (external system level) affecting implementation

Codes	Sub-codes and Illustrative Quotes
Common factors	
Regulatory Frameworks	"Oh, it's not mandatory? I thought it was mandatory, because when you apply for licensing, they ask for nutrition policy" Case 1 – Owner "I don't think is compulsory by the government, its compulsory by accreditation (…) mostly accreditation people want those kind of policy, even though you are not providing it (foods), make sure parents are following it" Case 1 – Director "We were like grilled, she called us up, one by one, and she was like "you have to do this this", "this is what you've been doing right", "this is what you have been doing wrong", that's because we had accreditation recently" Case 1 – Educator 2 "We looked at our policies recently getting ready for accreditation" Case 2 – Director "It (policy) was submitted to licensing and accreditation. Every time they come and visit, specially accreditation, they will see the menu plan, all the evidences, and part of that is the nutrition policy, is in line with our menu? In line with Alberta or Canada Food Guide?" Case 3 – Director
Environmental un(stability)	<u>Workforce</u> "So, finding that right staff is very hard too. as much as possible we really want them to like stay, but if you feel they don't have that capabilities, and why let them stay?" Case 1 – Owner "It's definitely a stressful like because it's hard to find good childcare teachers, like very hard, there is slim pickings, so yeah, it's hard" Case 2 – Owner <u>Families' demographics</u> "I do not know if you ever interviewed any private daycare in the Northside, where people are unemployed, their kids lunches is all the time the noodles or soup or a lot of lot of sugar stuff, like chocolates, granola bar, or like sticky tank candies." Case 1 – Director "It (centre's resources) depends on where you are located, what areas they (centres) are, which families they (centres) serve, is it an area that has more low income? Supported housing? Lots of subsidized parents?" Case 2 – Director
Incentives and mandates	"So I mean, for the government they have like Alberta childcare venture, so we use that resources too so. We ask so many questions, and it's free from the government, right? So, it's like consultation, everything." Case 1 – Owner

	"It would be nice, since we have guidelines to follow from the government, it would be nice that they have grants or something to help us feed these kids a lot (…) But it would be nice if they gave top up to the cooks so that you could hire proper people that can maintain that nutrition, the high nutrition standard. That would help. Because I have had to pay her more than the other Cooks because she came with knowledge (.)" Centre 2 – Owner
Distinct factors	
Inter-organizational networks and relationships	"Before we open, we consult with other centres, how they were able to come with this (…) We check other centres' policies just to see how they were able to come up". Case 1 – Owner "It would be great for us to have a network, all the owners, not only like *there is a policy*, *but what are your challenges, what's your problem right now?*" Case 1 – Owner "We have a Facebook group, we share ideas and post pictures of what our cook is making, we have that channel" Case 2 – Owner "Also because we are a member of CAFRA, it's like an organization for and resources for administrators that are not for-profit, so I'm attending all those meetings. And that's where I get resources as well." Case 3 – Director

*Factors not embedded in the PARIHS framework

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6 Discussion and Conclusions

6.1 Overview of findings and strengths of the mixed-methods approach

My thesis consisted of a sequential mixed-methods study conducted from 2016 to 2020 in the city of Edmonton, Alberta. In study 1, conducted from 2017 to 2019, through a scoping review methodology, I reviewed how theories, models, and frameworks (TMFs) were selected, used, and reported across 38 studies promoting healthy eating environments in child care centres. Although the results showed that the use of TMFs is becoming popular in the child care setting, with different types of TMFs targeting different socio-ecological levels, the majority of studies relied on individual-level TMFs, which might not be sufficient to promote change in child care food environments and practices. In addition to that, TMFs were lacking integration throughout study objectives, designs and outcomes, which limits the effectiveness of TMFs and might result in TMFs being erroneously deemed ineffective. Ultimately, few reports described how TMFs were operationalized, which inhibited replicability and the understanding of how much TMFs adapted to fit in the child care context. In conclusion, the review showed that theoretically-informed implementation studies are growing, but the selection, use, and reporting of TMFs are necessary so we can fully realize their benefits for theory, research, and practice.

In study 2, I conducted a cross-sectional, web-based survey with 43 child care centres across the metropolitan region between 2018 and 2019. The survey aimed to describe administrative policies on food and nutrition in place at child care centres, and the resources and processes to support their implementation. I also explored whether policy adoption and implementation were related to child care or child care administrators' characteristics. In total, 43/312 (13.8%) child care centres completed the survey. The majority of child care administrators who participated in the survey had a post-secondary degree (69.8%) and at least 5 years of experience administrating child care centres (60.5%). Child care administrators were from centres that were in operation for more than 10 years (65%) and located in a major city (82.1 %). Almost all of the participating centres had a food and nutrition policy in place (94%).

However, on average, only about 9 of the 17 resources and processes (range 1–17) required to support policy implementation were well-established across centres. More often, policies lacked description or goals and providers' responsibilities, centres did not secure resources for policy implementation and lacked evaluation of policy implementation. No differences were observed in policy adoption (i.e., having a policy in place) or implementation based on child care size, service type (i.e., profit or non-profit), accreditation status or administrators' years of experience. Child care administrators' education level was associated with policy implementation, but not adoption. In summary, the survey revealed that having a food and nutrition policy seemed to be common for child care centres in Alberta. It also showed that child care administrators might need additional training and support to fully implement existing administrative policies on food and nutrition.

In study 3, from 2019 to 2020, I conducted a multiple case study with three urban child care centres located in Edmonton. The case studies provided a comprehensive description of the factors that might influence FNP implementation in child care centres. The PARIHS framework was used to guide the interview questions and data analysis. The three cases differed in terms of organizational type and years of operation. Study participants represented different age groups, ethnicities, and overall were well-educated and had limited experience in child care. In terms of innovation, lack of clarity on FNP and the limited degree of fit were the main gaps to implementation, but FNP advantages, sources, usability also played important roles. FNP's implementation was further constrained by recipients' low commitment (specifically parents) and knowledge and skills (specifically, providers), which were overall similar across cases. The main difference was observed in terms of providers' power and authority to enforce policies. In general, child care centres were supportive of FNP implementation, but mechanisms to embed and evaluate FNP implementation lacked focus on FNP. As expected, cases did not differ much in terms of external system-level factors, except for inter-organizational networks, which varied across the different organizational structures (profit, non-profit, franchised).

One of the strengths of this sequential mixed methods design was the complementary data between studies. The results of the scoping review reported in chapter 3 helped to make a more informed decision regarding the theoretical framework used to frame the case study. Also, the case study presented in chapter 5 helped to understand some of the survey presented in the survey described in chapter 4. For example, how regulatory frameworks indeed influenced child care centres adoption of FNP.

6.2 Significance of findings

The results presented in this thesis helped to address some of the gaps in implementation research in the child care setting. For instance, previous studies have suggested that TMFs use can increase the likelihood of more effective implementation strategies in the child care setting. The scoping review presented in chapter 3 highlighted many gaps in TMFs selection and use, thus suggesting that only TMFs use might not be enough. Careful selection and use TMFs might be needed to yield better implementation effectiveness. Besides, TMFs are often seen as living tools, and better reporting practices are essential to guide future research and improvements in TMFs.

In addition to that, FNP are on the rise. FNP are also a common target of interventions aiming to improve child care food environments [1]. However, previous research has shown an apparent disconnect between administrative FNP and child care providers' practices [2–4]. Research on FNP implementation in the child care setting is scarce. Until now, no studies in Canada have attempted to describe FNP implementation and the issues associated with the implementation. This thesis filled those important gaps. For instance, the cross-sectional survey showed that although FNP seem to be a common tool used by child care centres, improvements in FNP development and implementation are still needed, particularly in terms of stakeholders engagement, establishment of goals and evaluation. The survey results also pointed to the relevance of equipping child care administrators with the right set of knowledge and skills in order to improve FNP implementation.

The case study showed that licensing and accreditation requirements played an important role in the child care's decision to have administrative FNP in place. It also revealed a concerning picture once awareness of FNP was low even among centres considered to be high implementers. The case study also revealed important barriers for FNP implementation. For instance, although child care administrators and providers saw many advantages in having FNP in place at their child care facilities, which could help to create a receptive context for policy implementation[5], administrators showed a limited capability to facilitate FNP implementation. Having this foundational knowledge of how child care centres are carrying out the implementation of FNP will help researchers and policymakers to understand why policies are not working and can guide future interventions tailored to what is needed to improve FNP implementation and effectiveness [6]. This thesis adds to the scarce to the body of literature and research on the implementation of FNP in child care settings and also contributes to changes in practice.

6.3 Recommendations for Implementation Research

This thesis represented one of the first steps towards understanding the gaps in translating FNP to practice in child care centres. Although it provided unique insights about the factors influencing FNP implementation, many questions remain unanswered and more research is still needed. This section describes recommendations for future implementation research (i.e., production of generalizable knowledge about implementation processes and outcomes) that would benefit and guide improvements in child care food environments. Recommendations are primary and secondary extensions of this thesis, including:

Systematic or Scoping Reviews

- Similar to the scoping review conducted by McIsaac [7], implementation research in the child care setting would benefit from a comprehensive review of the barriers and facilitators for FNP implementation. Such a review would expand previous reviews on

the barriers and facilitators for dietary guideline implementation conducted by Seward [8] and on implementation strategies to improve healthy eating policies and practices by Wolfenden[1]. It would be important to consider all areas where FNP could act, such as meal provision, interactions between children and educators around food, and interactions with families. Understanding barriers and facilitators for FNP implementation could guide the selection of theoretical approaches and implementation strategies to be used.

- To enhance the use of TMFs in implementation research in the child care setting, a follow-up consultation exercise based on the results of the scoping review would be beneficial. Researchers and providers in the child care setting should be part of the consultation. This exercise would help to unveil barriers for TMFs selection, use, and reporting. From that, it would be possible to draw recommendations and tools to facilitate TMFs selection, use, and reporting by researchers and practitioners. In addition to that, the search strategy used in the scoping review could be updated and form the basis for a systematic review to explore whether differences in TMFs selection and use have any impact on implementation and intervention outcomes.

Qualitative Approaches

- An additional case study to explore child care centres with optimal FNP implementation would be an added benefit to the research literature. As shown in this study, using a survey to identify cases with low and high implementation is challenging (e.g., selection and self-reporting bias). Thus, exploring other strategies to identify cases are recommended (e.g., consultations with public health dietitians who work in close relationship with child care centres). Identifying and describing resources and processes in place in exemplary cases could help to identify context-relevant strategies to overcome barriers for FNP implementation to be used in future studies. But more importantly, it would be relevant to explore cases without FNP (non-adopters) or where implementation

is low. Such cases could provide a unique perspective about child care functioning without the aid of an explicit policy and insights about additional barriers for FNP implementation.

- In addition to that, sampling additional cases could form the basis of a grounded theory approach to organize the factors identified as relevant for the FNP implementation into a lower-level theory for the implementation of FNP in child care settings.

Quantitative Approaches

- As large and well-designed surveys in Canada are scarce, a cross-sectional survey could be conducted with a representative sample of child care programs (centre and home-based) across Canada. The survey could aim to explore the association between different provincial policies (e.g., licensing requirements and guidelines) and incentives (e.g., accreditation systems) on child care centres FNP and practices. Using different survey modes (e.g., telephone-based and internet-based) would help to increase response rates. To avoid self-reporting bias, it would be ideal to combine different sources of information, such as managers and staff self-reports and child care documents (e.g., FNP, menus, and curriculums). Moreover, it would be necessary to account for factors that would mediate the relationship between political contexts and practices, including additional support or incentives provided by each province, child care centres exposure to support or incentive and child care and providers previous education and training in child care, leadership/management, and food and nutrition. In addition to that, collecting cross-sectional data across multiple time points would support gathering baseline data in a timely-fashion for natural experiments to evaluate the impact of changes in provincial policies on child care centres' policies and practices.
- Furthermore, more experimental studies are needed that test whether well designed and implemented (e.g., implementation plans, mechanisms, evaluation) FNP are effective in promoting consistent and sustainable healthy food environments in child care settings.

Hybrid mixed-methods sequential designs would be useful to simultaneously address implementation strategies' effectiveness (e.g., which resources and capacity building strategies result in improvements in FNP content and implementation) and FNP effectiveness (e.g., whether well designed and implemented FNP improve practice). The overall planning of this study could be guided by models such as the PRECEDE-PROCEED[9] and/or Intervention Mapping Approach[10]. The case study conducted as part of this thesis (Chapter 5) provided rich contextual information that can be used to inform appropriate implementation strategies. In addition to that, the Level of Institutionalization scale used in our survey (Chapter 4) can be used to collect information regarding the effectiveness of implementation strategies in improving FNP implementation. For additional implementation outcomes, Proctor's [11] comprehensive list can be consulted alongside Lewis's [12] review of psychometrically sound instruments against each of the implementation outcomes proposed. It is fundamental to also include measures used to assess the dimensions of the theory or framework underpinning the capacity building intervention [13]. Furthermore, the use of a mixed-methods approach would not only decrease the potential risk of bias known to be associated with self-reported measures but further support to elucidate how implementation strategies influenced policy and practices.

6.4 Recommendations for Practice

Existing food and nutrition policies in Alberta have not yet managed to curb unhealthy food environments and practices in child care centres. As such, this section describes recommendations for implementation practice (i.e., applied work to improve the implementation process and outcomes in a local context) with the potential to improve food and nutrition policy effectiveness.

- First, as presented in the case study (Chapter 5), the government sector plays a crucial role in influencing and supporting child care centres FNP and environments. One of the

purposes of FNP is to translate government policies into child care centre's practices. However, current licensing regulations for child care are not reflective of the various relevant aspects of the child care food environment that impact children's diets and health, for example, healthy meal environments, nutrition education and guidance for families[14]. Although broader content areas are suggested by the ANGCY guidelines, as they are voluntary, it could result in some centres sticking to the minimum requirements, thus increasing inequalities across centres. Therefore, licensing requirements could be reviewed to encompass missed aspects of child care food environments that affect children's diets and eating behaviours. Beyond guiding the content of FNP, supporting documents for licensing could further describe additional elements to be included in FNP or policy handbooks, such as policy goals, providers and families' roles and responsibilities, detailed implementation plans (e.g., how policies will be communicated, enforced, and monitored; and which resources, such as financial, human and professional development, are necessary and how resources will be secured) and sources of information used. Principles from marketing science and knowledge utilization can be used to display such information in practical ways to reduce the complexity of the implementation for child care administrators with limited knowledge and skills in policy development [5]. Also, revisions of regulations and supporting documents would benefit from including researchers, policymakers, and representatives from the child care industry. Engagement of stakeholders would ensure that proposed are feasible, and also that supporting documents' readability, comprehension, translation, and application are appropriate for the users.

- Second, it might not be enough just to change regulations and supporting documents [15]. Child care administrators must be capable to facilitate FNP implementation and allocate sufficient resources so child care providers feel ready to implement FNP. Previous research on organizational readiness to implement nutrition programs in the child care

setting has described influential factors on providers' sense of readiness, including available infrastructural, and human resources, professional growth and training opportunities, organizational communication mechanisms and strategies, and parent engagement [16]. To equip child care administrators with advanced facilitation skills to better navigate the complexities of implementing FNP, the curriculum for early learning providers and professional development opportunities could be more consistent across institutions and include leadership and management content, but also food and nutrition best practices [17]. That could be achieved by collaborations between the government sector with educational institutions and centres to create common modules for training and professional development [15]. Curriculum and professional development opportunities should be reflective of expectations for child care administrators' role in policy implementation. Administrators with limited experience in the facilitation would also benefit from continued mentoring and support, and establishing professional networks to discuss barriers and strategies is something to be pursued [17]. Similarly, curriculum and professional development opportunities for child care providers could be better aligned with child care providers' expected roles in children's diets and health. Consistency across institutions is also something to be pursued. It is important that all child care administrators and providers have equal access to professional development opportunities [14].

- Third, implementation research and practice would benefit from collaborations between researchers, policy, and practice leaders. For instance, by working collaboratively, researchers, policymakers, and practitioners have a unique opportunity to exchange knowledge, skills, and experiences. Such an exchange of knowledge could translate in researchers' increased understanding of real-world implementation issues and practitioners' increased capacity to plan and evaluate their implementation efforts [18]. Furthermore, a collaboration between different stakeholders would improve the usability

and quality of future implementation endeavours [19]. In addition to that, collaboration could result in the creation of shared monitoring and evaluation systems that can be used to answer questions that are relevant for policy decisions, but also contribute the development of middle-range theories for what works in the child care.

6.5 Conclusion

FNPs are common and valued tools that can help to promote healthy environments in child care centres. Despite of child care providers motivation and commitment to instill healthy food habits in children and organizational processes in place that could support FNP implementation, there are still gaps in FNPs development and implementation that limit their potential benefits to promote healthy environments and bring benefits to children's nutrition and health. Child care administrators play an important role in FNPs development, implementation and evaluation, as such, there is a need to improve child care administrators capacity for FNP development and implementation. Provincial policy reformulation along with improvements in child care curriculum and stakeholders participation can help to identify gaps, and build effective options to address the the complexities inherent to FNP implementation.

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Chapter 1

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Appendices

Appendix A

Search Strategy

1 (playschool* or out of school care or after school care or nurser* school* or creche* or kindergar*en or kinder-garten* or playgroup* or play-group*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (6069)

2 Child Care/ (5389)

3 Schools, Nursery/ (1460)

4 Child Day Care Centers/ (4712)

5 (daycare* or day-care* or daycentre* or daycenter* or (day adj3 care) or (day* adj2 (centre* or center*))).mp. (16685)

6 ((centre-based adj3 care*) or (center-based adj3 care*)).mp. (168)

7 (or/5-6) not (adult or adults).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (11976)

8 (or/1-5) or 7 (27768)

9 exp Food/ or exp Eating/ or exp Diet/ or exp Food Habits/ or food services/ or carbonated beverages/ or menu planning/ or nutritional status/ (1419612)

10 (food* or eat* or diet* or nutrient* or feeding program or menu or menus or soft drink* or sweetened drink* or cafeteria* or confection?ry or canteen* or junk food* or vegetable* or fruit or fruits).ti,ab. (947029)

11 nutrition*.ti,ab. (275329)

12 or/9-11 (2071635)

13 exp Models, Theoretical/ (1535159)

14 Healthy People Programs/ (1114)

15 (program* or policy or policies or innovation or implementation).ti,ab. or change*.ti. or ((organisation* or organization*) adj3 (practice or practices)).ti,ab. (1410720)

16 "Organizational Innovation"/ (23127)

17 (strateg* or scheme* or schema or structure* or model*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (5089901)

18 or/13-17 (6123849)

19 (Niger or Central African Republic or Eritrea* or (Chad or Tchad) or Burundi* or Burkina Faso or Guinea* or Bissau or Sierra Leone or Mozambi* or Mali or Liberia* or Congo or Gambia* or Ethiopia* or Malawi* or (Cote d'Ivoire or Ivory Coast) or (Afghanistan or Afghan*) or Senegal* or Djibouti* or (Sudan or Sudanese) or (Benin or Beninese) or (Haiti or Haitian*) or Rwand* or Uganda* or (Togo or Togolese) or (Lesotho or Lesothian*) or Yemen* or (Comoros or Grande Comore or Ngazidja* or Moheli* or Mwali* or Anjouan* or Nzwani*) or Papua or Maurit* or Solomon Island* or Zimbabwe* or Madagasca* or Cameroon* or Nigeria* or Tanzania* or Swaziland* or Angola* or Myanmar* or Pakistan* or Kenya* or Nepal* or Cambodia* or Sao Tome Principe or Bangladesh* or ("Lao People's Democratic Republic" or Laos) or Ghana* or Zambia* or Equatorial Guinea or Kiribati* or Syria* or Vanuatu or (Timor Leste or Timorese) or Bhutan* or Hondura* or India or Tajikistan* or Guatemala* or Morocc* or Namibia* or Nicaragua* or Guyan* or Micronesia* or Cabo Verde* or Iraq* or Kyrgyzstan* or Bolivia* or (El Salvador or Salvadoran*) or South Africa* or VietNam* or Philippin* or Uzbekistan* or Palestin* or Paragua* or Gabon* or Indonesia* or Turkmenistan* or Egypt* or Moldova* or Botswana or Samoa* or Maldiv* or Suriname* or Belize* or Dominican Republic or (Dominica* not (priest* or order*)) or Tonga* or Jamaica* or (Colombia* not (river or university)) or Saint Vincent or Grenadines or Tunisia* or Libya* or (Thailand or Thai) or (Fiji or Fijian*) or Mongolia* or (China or Chinese) or Saint Lucia or Ecuador* or Albania* or Armenia* or Herzegovina or Bosnia* or (Peru or Peruvian*) or Algeria* or Macedonia or Ukrain* or Jordan* or (Grenada or Grenadian*) or Azerbaijan* or (Saint Kitts or Nevis or Saint Christopher Island) or (Georgia* not (University or United States)) or Albania* or Algeria* or (Antigua* or Waladli or Wadadli) or Barbuda* or Azerbaijan* or (Bahamas or Bahamian*) or (Barbados or Barbadian* or Bajan*) or Belarus* or Brazil* or Bulgaria* or (Costa Rica or Costa Rican or Costa Ricans) or (Cuba or Cuban*) or (Iran or Iranian*) or Kazakhstan* or (Lebanon or Lebanese) or Malaysia* or (Mauritius or Mauritian*) or (Mexico or Mexican*) or Oman or Omani* or Palau* or (Panama or Panamanian*) or ("Saint Kitts and Nevis" or "Federation of Saint Christopher and Nevis") or Seychelle* or Serbia* or (Sri Lanka* or Ceylon*) or ("Trinidad and Tobago" or Tobagonian* or Trinbagonian*) or (Turkey or (Turkish not coffee) or Turk) or Uruguay* or Venezuela*).mp.[mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (1398611)

20 Niger/ or Central African Republic/ or Eritrea/ or Chad/ or Burundi/ or Burkina Faso/ or Guinea/ or New Guinea/ or Guinea-Bissau/ or Equatorial Guinea/ or Sierra Leone/ or Mozambique/ or Mali/ or Liberia/ or Congo/ or Democratic Republic of the Congo/ or Gambia/ or Ethiopia/ or Malawi/ or Cote d'Ivoire/ or Afghanistan/ or Senegal/ or Djibouti/ or Sudan/ or Benin/ or Haiti/ or Rwanda/ or Uganda/ or Togo/ or Lesotho/ or Yemen/ or Comoros/ or Papua New Guinea/ or Mauritius/ or Zimbabwe/ or Madagascar/ or Cameroon/ or Nigeria/ or Tanzania/ or Swaziland/ or Angola/ or Myanmar/ or Pakistan/ or Kenya/ or Nepal/ or Cambodia/ or Bangladesh/ or Laos/ or Ghana/ or Zambia/ or Kiribati/ or Syria/ or Vanuatu/ or Bhutan/ or Honduras/ or India/ or Tajikistan/ or Guatemala/ or Morocco/ or Namibia/ or Nicaragua/ or Guyana/ or Micronesia/ or Cabo Verde/ or Iraq/ or Kyrgyzstan/ or Bolivia/ or El Salvador/ or South Africa/ or VietNam/ or Philippines/ or Uzbekistan/ or Palestine/ or Paraguay/ or Gabon/ or Indonesia/ or Turkmenistan/ or Egypt/ or Moldova/ or Botswana/ or Samoa/ or Maldives/ or Suriname/ or Belize/ or Dominican Republic/ or Tonga/ or Jamaica/ or Colombia/ or "Saint Vincent and the Grenadines"/ or Tunisia/ or Libya/ or Thailand/ or Fiji/ or Mongolia/ or China/ or Saint Lucia/ or Ecuador/ or Albania/ or Armenia/ or "Bosnia and Herzegovina"/ or Algeria/ or "Macedonia (Republic)"/ or Ukraine/ or Jordan/ or Grenada/ or Azerbaijan/ or "Saint Kitts and Nevis"/ or "Georgia (Republic)"/ or Albania/ or Algeria/ or "Antigua and Barbuda"/ or Azerbaijan/ or Bahamas/ or Barbados/ or "Republic of Belarus"/ or Brazil/ or Bulgaria/ or Costa Rica/ or Cuba/ or Iran/ or Kazakhstan/ or Lebanon/ or Malaysia/ or Mauritius/ or Mexico/ or Oman/ or Palau/ or Panama/ or "Saint Kitts and Nevis"/ or Seychelles/ or Serbia/ or Sri Lanka/ or "Trinidad and Tobago"/ or Turkey/ or Uruguay/ or Venezuela/ (750748)

21 19 or 20 (1399269)

22 8 and 12 and 18 (1241)

23 22 not 21 (976)

Appendix B

Invitation for Scoping Review Consultation

Dear _____,

I am a Ph.D. candidate at the University of Alberta, Canada. As part of my Ph.D. thesis, I am undertaking a scoping review that aims to identify implementation frameworks and models used to guide or evaluate the implementation of new healthy eating interventions in child care centres.

I am contacting you because your study "_____" has been included in the second level of my review process.

If you are aware of any peer-reviewed article or report that used implementation frameworks or models to guide or evaluate the implementation of healthy interventions in child care, could you please attach a copy or supply an online link? Studies can be either qualitative, quantitative and multi or mixed methods.

I look forward to hearing from you.

Glossary of terms used:

1. Implementation frameworks and models: set of descriptive categories that together, help to develop, manage, and evaluate implementation efforts. Categories included in implementation frameworks and models can be:
   a. Variables perceived to affect the implementation process;
   b. Steps designed to guide the implementation process;
   c. And aspects that could be used to determine implementation success.
2. Healthy eating interventions: healthy eating policies, guidelines, programs or practices;
3. Child care centres: centre based facilities, including child care centers or day care centers, nurseries and kindergartens or preschool.

Appendix C

Codebook for direct content analysis – selection of frameworks

Themes and definition
1. Analytic level, e.g., individual, organizational, system
2. Constructs of interest, i.e., describe constructs targeted by the intervention and targeted by the TMF.
3. Description of a change process, i.e., provides an explanation of how changes in process factors lead to changes in implementation-related outcomes
4. Inclusion of change strategies/techniques, i.e., provision of specific method(s) for promoting change in implementation-related processes and/or outcomes
5. Empirical support, i.e., use in empirical studies with results relevant to the framework or theory, contributing to cumulative theory-building
6. Application to a specific setting (e.g., hospitals, schools) or population (e.g., cancer)
7. Inclusion of change strategies/techniques, i.e., provision of specific method(s) for promoting change in implementation-related processes and/or outcomes
8. Associated research method (e.g., informs qualitative interviews, associated with a valid questionnaire or methodology for constructing one), i.e., recommended or implied method to be used in an empirical study that uses the framework or theory
9. Process guidance, i.e., provision of a step-by-step approach for application
10. Disciplinary approval, i.e., frequency of use, popularity, acceptability, and perceptions of influence among a given group of scholars or reviewers, country, funding agencies, etc.; endorsement or recommendation by credible authorities in the field
11. Explanatory power/testability, i.e., ability to provide explanations around variables and effects; generates hypotheses that can be empirically tested
12. Simplicity/parsimony, i.e., relatively few assumptions are used to explain effects
13. Uniqueness, i.e., ability to be distinguished from other theories or frameworks
Source: Adapted from Birken et al., (2017)

Appendix D

Scoring system for rationale, use and reporting use of theoretical approaches

Name of the theoretical approach:_____

Reporting the use of existing approaches		
1	2	3
Rationale: no rationale for the selection of the theory, model or framework is provided **Use:** the chosen theory, model or framework is not linked to the study objectives, hypotheses, and measures **Reporting:** the chosen theory, model, or framework name or author is mentioned, but not further details are provided.	**Rationale**: the rationale for the selection of the theory, model or framework is provided, but not clearly supported with citations from the literature **Use:** the chosen theory, model or framework is linked in some capacity to the study objectives, hypotheses, and measures, but may need additional clarification **Reporting:** elements of the theory, model, or framework are mentioned, but their application in the context is not described.	**Rationale**: the rationale for the selection of the theory, model or framework is supported with citations from the literature **Use:** the theory, model or framework is used to frame the proposed study in all aspects including the study questions, aims/objectives, hypotheses, process, and outcome measures **Reporting:** the use of the theory, model or framework is clearly described, with elements (factors, steps or stages) explicitly described within the proposed setting, population, and intervention contexts

Source: Adapted from Crable et al., (2018)

Reporting the elements of new approaches		
Development: The approach itemises a range of factors, strategies, or evaluations with no explanation for their inclusion **Reporting:** Factors, strategies, or evaluations provided as a list without descriptions	**Development:** The approach itemises a range of factors, strategies, or evaluations with some form of justification for their inclusion; **Reporting:** Factors, strategies, or evaluations provided with descriptions;	**Development:** The approach itemises a comprehensive range of factors or strategies based on a literature review or evaluations covering each of the concepts included in the framework. **Reporting:** Factors, strategies, or evaluations provided with descriptions which included the relationships between or within the elements (factors, strategies, and evaluations) or mechanisms for operationalization

Source: Adapted from Moullin et al (2005)

Appendix E
Characteristics of included studies

Study 1: Jones et al., 2014; Jones et al., 2015.
Design: Parallel group randomized controlled trial design
Location: New South Wales, Australia
Setting: Centre-based childcare services (preschool and long daycare) that do not provide onsite meals.
Objectives: Assess the effectiveness of a multicomponent intervention in increasing the implementation of healthy eating and physical activity policies (consistent with Australian healthy eating guidelines).
Intervention: Healthy eating and physical activities policies and practices.
Implementation strategy: Ongoing face-to-face, email and telephone implementation support, secured executive support through telephone, face-to-face and newsletter, consensus processes, staff training, academic detailing visits, provision of tools and resources, feedback reports and newsletters.
Population: Nominated supervisors and room leaders.
Measured outcomes: Written nutrition and physical activity policy, staff role modelling nutrition and physical activities, guided fundamental movement skills development and restriction of sedentary behaviours, and monitoring lunch boxes and feedback to parents; Child dietary intake, physical activity, the acceptability of the intervention, and adverse effects.
Theoretical approach used: Consolidated Framework for Implementation Research (CFIR).
Utility: CFIR is a comprehensive conceptual framework that affects intervention effectiveness.
Use: Design of implementation strategies – strategies were aligned with all CFIR five domains.
Limitations and recommendations: Trial did not measure the change in perceived barriers and enablers to implementing the policies and practices and any mechanisms that may have facilitated the outcome. Direct implementation efforts where there might be greater scope for improvement, for example, centres where implementation was poor.
INSPECT: CFIR - 3:3:3

Study 2: Wolfenden et al., 2015.

Design: Cross-sectional survey design.

Location: New South Wales, Australia.

Setting: Preschools and long day care centres.

Objectives: Assess whether a comprehensive set of theoretically based factors, as reported by ECEC Service Managers, are associated with the implementation of healthy eating and physical activity policies and practices in line with best practices and national recommendations for ECE.

Intervention: Nutrition and physical activity policies and practices.

Implementation strategies: Workshops and technical support not uniformly delivered, and not part of the study.

Population: Service managers.

Measured outcomes: Healthy eating and physical activity policies and practices.

Theoretical approach: Consolidated Framework for Implementation Research (CFIR).

Utility: CFIR provides a comprehensive examination of factors associated with the implementation of healthy eating and physical activity policies and practices in ECEC services

Use: Identify factors - survey collected information on CFIR constructs considered relevant to the implementation of healthy eating and physical activity policies and practices in ECEC services. Constructs were selected based on their relevance.

Limitations and recommendations: The lack of available validated instruments to assess the theoretical constructs of the CFIR. Develop simple evidence-based strategies that are congruent with staff skill and capacity.

INSPECT: CFIR - 2:3:3

Study 3: An-Sofie Pinket et al., 2016; Androutsos et al., 2014; Manios et al., 2014; Manios et al., 2012; Payr et al., 2014.

Design: Randomized, cluster, multi-component, kindergarten-based, family-involved intervention.

Location: Oost-Vlaanderen and West-Vlaanderen (Belgium), Varna (Bulgaria), Bavaria (Germany), Attica (Greece), Mazowieckie (Poland) and Zaragoza (Spain).

Setting: Kindergarten, preschool and day care.

Objectives: Build and evaluate a cost-effective kindergarten-based, family-involved intervention scheme aiming to prevent obesity and ensure preschool's children optimal growth and development.
Intervention: Toy-box program.
Implementation strategies: Training sessions for teachers on how to implement the intervention (environmental changes in the classroom, interactive classroom activities and promotion of targeted behaviours and, parent's newsletter).
Population: Child care staff, parents and children.
Measured outcomes: Children BMI, children dietary and sedentary or physical activities behaviours and their determinants (parents and teachers' knowledge, beliefs, attitudes, BMI, physical activity, eating and sedentary behaviours, parenting practices, and school environment) and cost-effectiveness.
Theoretical approach used:
PRECEDE-PROCEED
Intervention Mapping Approach
Han's model of intervention sustainability – not included (not explicitly cited)
Utility: PP model has been considered the best planning model on usefulness for research and practice, and its use could increase the sustainability of an intervention. IMA provides a step-wise process to increase the likelihood that the program will achieve its goals, help effective implementation and evaluation, provide an opportunity to involve the community, and maximize sustainability.
Use: Implementation steps - The development of the intervention was based on the PRECEDE-PROCEED model and the intervention mapping protocol.
Limitations and recommendations: PP models lack a step-wise practical guide for the development of the intervention. Future studies should focus on the underlying mechanisms of implementation in different environments that consider policy and sociocultural factors for a higher likelihood of behaviour change.
INSPECT: Intervention Mapping - 3:3:3
PRECED-PROCEED – 3:3:3

Study 4: Messiah et al., 2016; Natale, et al., 2017.
Design: Cluster randomized, controlled trial.
Location: Miami Dade County (MDC), FL, USA.
Setting: Childcare centres.

Objectives: Develop, test, and evaluate the efficacy and effectiveness of the "Healthy Caregivers–Healthy Children" (HC2), a theoretically based, multifaceted obesity prevention intervention (Toolkit reflect policy requirements for preschool children in Florida).
Intervention: HC2 program.
Implementation strategies: Centres received technical assistance; Phase 2 (scale-up): disseminated via train the trainer; Toolkit was delivered through workshop sessions; Proactive technical assistance; Training counted continued education (incentive).
Population: Directors, teachers, parents, and children.
Measured outcomes: Provider - nutrition patterns; Policy implementation - environmental changes (EPAO), readiness to change (survey on readiness), and stakeholder consultation (positive and adverse outcomes - new legislature and opportunities); Child outcomes (intake and BMI); Process evaluation (barriers, solutions to barriers and adaptations in the program), and incorporation of HC2 on QRIS/Quality Counts.
Theoretical approach used:
RE-AIM framework
Social Cognitive Theory
Adult learning
Utility: RE-AIM has been applied to policies, community-based multi-level interventions, and the reduction of health disparities, and as such is ideal for child care setting, local populations, and project goals. Using the RE-AIM will generate robust and new information to the field concerning potential barriers, facilitators, adoption, and sustainability in this setting; The Train the Trainer approach was developed based on the social cognitive theory and adult learning models that incorporate the following three objectives: 1) knowledge; 2) self-efficacy; and 3) follow-up support (proactive technical assistance), with the primary goal of ensuring that the coaches are as motivated and effective as "Master Trainers"
Use: Specify outcomes **-** RE-AIM framework was used to organize key elements in evaluating the intervention potential for successful dissemination (i.e., reach, effectiveness, adoption, implementation, and maintenance); Design of Implementation strategies - The training program for nutrition gatekeepers (providers/caregivers) included objectives related to SCT constructs. The "train the trainer" used for scale-up was developed based on SCT and adult learning.
Limitations and recommendations: It takes some buy-in time for parents to accept a new CCC-based program. It is important to identify opportunities for coordination and

collaboration between health professionals and the community. Future research should assess the impact of parental/caregiver perception and motivation on obesity prevention.

INSPECT: RE-AIM - 3:3:3

SCT – 3:3:3

Adult learning: 3:2:3

Study 5: **Larsen et al., 2017.**

Design: Quasi-experimental design with pre- and post-survey.

Location: California State, USA.

Setting: Kindergartens.

Objectives: Evaluate the efficacy and overall public health impact of the Building a Healthy Me (BHM). The program was designed to align with Dietary Guidelines and the United and California's Common Core Content Standards and California and National Health Education Standards.

Intervention: Building a Healthy Me (BHM).

Implementation strategies: Teacher's guide with instructions and lesson plans, a poster of nutrition information, a box of food pictures, a student workbook, and family homework to build on concepts taught during the units.

Population: Kindergarten staff, parents, and children.

Measured Outcomes: Efficacy - child knowledge (child reported) dietary intake and nutrition behaviours (parent-reported); nutrition-related parenting practices (parent-reported). Implementation - via teacher logs (delivery, helpfulness, appropriateness, and satisfaction) and parent surveys (awareness and use of materials); Reach, adoption and maintenance - via secondary data (order of BHM materials).

Theoretical approach used:

RE-AIM framework.

Health Belief Model – not included (curriculum for parents).

Socio-Cognitive Theory – not included (curriculum for parents).

Utility: The RE-AIM framework evaluates program implementation and dissemination along with effectiveness, and therefore public impact.

Use: Outcome indicators - the study used the RE-AIM framework to evaluate the intervention.

Limitations and recommendations: Outcome variables used did not directly reflect intended outcomes (i.e., ordering of materials to indicate use).

INSPECT: RE-AIM - 3:3:3

Study 6: **Grady et al., 2018. Seward, et al., 2017.**
Design: Cross-sectional survey design.
Location: New South Wales, Australia.
Setting: Centre-based childcare services (specifically long day care services (LDCs).
Objectives: Develop and establish the content validity, reliability, discriminant validity, and goodness of fit of the TDF and identify barriers and enablers to implementation and their association with menu compliance.
Intervention: Australian dietary guidelines.
Implementation strategies: Workshops and technical support not uniformly delivered, and not part of the study.
Population: Cooks.
Measured Outcomes: Barriers and enablers based on the TDF domains and implementation of the Australian dietary guidelines.
Theoretical approach:
Theoretical Domains Framework (TDF)
Utility: TDF is a comprehensive framework that has the potential to provide a theoretical assessment of the barriers and enablers to implementing dietary guidelines and to identify behavioural change factors to guideline implementation.
Use: Identify factors - An adapted version of the 14-domain TDF was used to assess barriers and enablers to implementing dietary guidelines as specified in the NSW ECE best-practice dietary guidelines. Modification on the TDF was based on feedback from stakeholders and expert opinion.
Limitations and recommendations: It is difficult to develop a comprehensive questionnaire that satisfactorily measures the 14 TDF domains while being of a reasonable length; The measure may not be sufficiently discriminant for this setting. Researchers using a quantitative tool should also be aware of possible incongruence between self-reported and actual barriers to guideline implementation. All individuals engaged with menu planning should be included in future assessments.
INSPECT: TDF - 3:3:3

Study 7: Esquivel et al., 2016a. Esquivel et al., 2016b.
Design: Randomized community trial.

Location: Hawaii, USA.
Setting: HeadStart (HS) centres.
Objectives: To build evidence on the effectiveness of a Childcare Centre-based intervention that used training and technical assistance and employee wellness activities in collaboration with HS teachers to help with the implementation of HS wellness policies for childhood obesity prevention.
Intervention: Children's Healthy Living Program (CHL).
Implementation strategies: Employee wellness activities for teaching staff, and resources for classroom nutrition and physical activities (PA).
Population: teachers and children.
Measured Outcomes: Classroom environment; child intake and BMI; HS teachers' health status, eating and PA behaviours, and efficacy, misconceptions, and knowledge related to child nutrition and priority placed on childhood obesity prevention.
Theoretical approach used:
Baranowski & Russell. Understanding the mechanisms of change in children's physical activity programs.
Utility: Implementation steps - Baranowski 's model for intervention evaluation was specifically designed to enhance understanding of how interventions yield desired outcomes. Mediation and moderation analysis offer a means to improve understanding of intervention and program outcomes.
Use: Baranowski's model was used to inform which mediators and moderators to assess.
Limitations and recommendations: Reliance on single assessment of outcomes. Holistic efforts that include the family and home environments and child motivation to make healthy choices in addition to policy changes may have a synergistic effect on child-level obesity outcomes; an intervention that includes multiple components within the organizational coupled with classroom can produce a greater intervention effect on aspects of the classroom environment.
INSPECT: Baranowski & Russel - 2:2:2

Study 8: Fraser, 1995.
Design: The Solomon Four-Group Design
Location: Michigan, USA.
Setting: Childcare setting (childcare centres and day homes).

Objectives: To determine the effect of the educational booklet entitled What You Cannot See Can Hurt Y our Kids and You! on the safe food handling perceptions.
Intervention: Educational booklet.
Implementation strategies: Booklets were given to providers.
Population: Centre teachers and home-based childcare providers.
Measured Outcomes: Perceived susceptibility to foodborne illness; the Perceived seriousness of foodborne illness; Perceived benefits of handling food safely; Perceived consequences of not handling food safely; the Perceived importance of handling food safely; Health locus of control; Self-efficacy; Value on good health; Knowledge about safe food handling.
Theoretical approach used:
Health Belief Model
Utility: As it was considered impossible to measure every factor that would predict the outcome, the researcher selected factors from the HBM as it has already predicted food safety behaviour and the model was perceived to explain the most variance in the outcomes of interest.
Use: Identify factors - Model was used to develop a theoretical model that informed an instrument to assess factors that affect preventive behaviours (safe food handling). The process of selecting factors to include in the model was based on the existing literature and conversations with child care providers working in both daycare homes and child care centres.
Limitations and recommendations: Factors such as health locus of control and motivation were added to HBM to further improve the predictive power of the HBM.
INSPECT: Health Belief Model – 3:3:3

Study 9: Buscemi et al 2015.
Design: Descriptive – provide recommendations.
Location: USA.
Setting: ECE settings.
Objectives: Provide a set of recommendations based upon "models that provide concrete steps to implement obesity prevention initiatives" that will help state and local policymakers to improve current policies.
Intervention: Policies can affect obesity prevention among preschool.
Implementation strategies: Not applicable.

Population: State and local policymakers.
Measured Outcomes: Not applicable.
Theoretical approach used:
Spectrum of Opportunities for Obesity Prevention in Early Care and Education.
Utility: Process steps that help state and local leaders to implement strategies for obesity prevention in ECE settings; leaders can use to address obesity across states and types of ECE settings; as a guide to help leaders implement obesity prevention efforts in ECE settings.
Use: Provide actionable recommendations based on the model 5 step process that help implementation of obesity prevention in ECE settings.
Limitations and recommendations: Multiple coordinated opportunities must be pursued to promote change; Local and state officials should monitor adherence to posed regulations.
INSPECT: Let's move spectrum of opportunities – 1:2:3

Study 10: Barrett & Riggins, 2008; Riggins., 2006.
Design: Cross-sectional survey.
Location: Colorado, Iowa, Kansas, Missouri, Nebraska, and Oklahoma, USA.
Setting: Child care setting.
Objectives: To determine beliefs and perceptions of directors and foodservice employees about benefits, barriers, and intentions to follow HACCP-based food safety programs and to examine differences based on employment status, educational level, and food safety certification.
Intervention: HACCP-based food safety programs.
Implementation strategy: Not applicable**.**
Population: Centre directors and foodservice employees who were members of the National Association for the Education of Young Children (NAEYC).
Measured Outcomes: Demographics, perceived susceptibility, severity, benefits, barriers, self-efficacy, behavioural intentions and implementation status (e.g. personal hygiene, pest control, chemical storage, purchasing products).
Theoretical approach used:
Health Belief Model
Utility: The Health Belief Model (HBM) has been used successfully to identify preventative health behaviours and was therefore judged to be appropriate for use in the current study. The HBM has been used in food safety research.

Use: Identify factors to develop an instrument to assess food safety beliefs and perceptions of Childcare Centre directors and foodservice employees; Using the instrument, test a modified Health Belief Model that would evaluate behavioural intentions to follow a HACCP based food safety program.
Limitations and recommendations: The construct self-efficacy and behavioural intention were added to determine levels of confidence (skills and ability) and intention of following a HACCP-based food safety program.
INSPECT: Health Belief Model – 3:3:3

Study 11: Adams & Dietrich, 2009; Adams, Molyneux, & Squires, 2011; Zask, Adams, Brooks & Hughes, 2012.
Design: Pre- and post-quasi-experimental.
Location: New South Wales, Australia.
Setting: Rural preschools.
Objectives: Described the program's methodological aspects, and strategies that continued at two and three years after the intervention year and views from preschool staff and why some strategies had better sustainability than others did.
Intervention: Regular Fundamental Movement Skills (FMS) sessions as part of the preschool curriculum; children cooking classes; and improving access to drinking water; skills development and awareness-raising for parents, staff, and children, and social support for parents to foster behaviour changes in their children through feedback and reinforcement (positive feedback and policies on food and drinks at preschool).
Implementation strategies: Development of a nutrition policy; staff training and parent workshops on healthy eating and fundamental movement skills; Project management committees (PMCs).
Population: Children, parents, and providers.
Measured Outcomes: Children's BMI and waist circumference; FMS proficiency; access and consumption of FV; Energy Dense Nutrients Poor (EDNP) food and sweet drinks; screen time; outdoors time; parenting styles.
Theoretical approach used:
Health Belief Model – not included (directed to parents)
Weiss - Motivating kids in physical activity – not included (directed to parents/children)
Goodman - Dimensions of community capacity
Hawe - Indicators to Capacity Building (not included – not explicitly stated)

Baum - The New Public Health (not included – not explicitly stated)
Utility: Capacity building and community participation theories have been applied to build community action and ensure the sustainability of the project. Building community capacity by empowering the target group is anticipated to lead to sustainability, particularly where leadership around this program has developed through PMCs.
Use: Design implementation strategy - Goodman's 10 dimensions of community capacity was used to ensure that strong networks were built, to enhance community resources, skills and power such as PMC meetings, training, and target group participation in planning and implementation were designed to develop a sense of community and shared values.
Limitations and recommendations: Did not measure the quality of strategy implementation.
Where evidence is sparse, interventions must be designed using relevant theories, be refined considering formative evaluations, and include rigorous evaluation; Interview not only directors and senior staff.
INSPECT: Community capacity - 2:3:3

Study 12: Benjamin et al., 2007. Benjamin et al., 2006; Ward et al., 2008.
Design: Delayed randomized control trial.
Location: North Carolina, USA.
Setting: Child care setting.
Objectives: Describe the development of an environmental intervention to address healthy weight for children in child care in North Carolina.
Intervention: Nutrition And Physical Activity Self-Assessment for Child Care (NAP SACC).
Implementation strategies: Environmental self-assessment, selection of areas for change, continuing education workshops, targeted technical assistance, and re-evaluation.
Population: Licensed Childcare centres.
Measured Outcomes: The Environment and Policy Assessment and Observation (EPAO) was the primary outcome.
Theoretical approach used:
Social Cognitive Theory (SCT)
Diffusion of Innovations (DoI)
Utility: The inherent relationship between environments and behaviours suggested the utility of using Social Cognitive Theory as the theoretical model for NAPSACC; Diffusion of

Innovation was applied to enhance diffusion by addressing many of the factors that affect diffusion processes.

Use: Design implementation strategies - The NAP SACC intervention was designed to reflect SCT key constructs. The overall NAP SACC project is designed to enhance diffusion by addressing many of the DoI factors.

Limitations and recommendations: Use of knowledge as the training outcome, and also not assessing actual skills; Use both objective and self-assessment measures to assess outcomes; Environmental intervention efforts that target both nutrition and physical activity policies and practices are needed to support individual-level change; Knowledge is not translatable to skills.

INSPECT: SCT – 3:3:3

DoI – 2:3:3

Study 13: Matwiejczyk, Colmer & McWhinnie 2007. Pollard, Lewis, Miller, 2001.

Design: Quasi-experimental.

Location: Western Australia, Australia.

Setting: Long daycare centres.

Objectives: Describes both the theoretical and practical aspects of the development, implementation, and evaluation of an award scheme to improve nutrition and foodservice standards; evaluate the appropriateness and delivery of the FSPCC short course; evaluate the impact of Start right-eat right (SRER) scheme on four outcomes (menus, food hygiene, food policies, and staff capacity).

Intervention: Start right-eat right award scheme.

Implementation strategy: Understanding the industry (needs assessment); the collaboration between industry and government; resources to support the scheme; incentives (award criteria was consistent with government regulation and accreditation guidelines).

Population: Childcare staff (cook and directors).

Measured Outcomes: Menu changes, food hygiene and safety, food policy and staff capacity.

Theoretical approach used:

Harris - Intersectoral Action for Health

Organizational change stage theory

Diffusion of Innovations

Utility: Organizational change stage theory guide the development of strategies to bring about policy, organizational, and individual behavioural changes to achieve improvements; The diffusion of innovation theory concepts can be used to explain the success in the adoption of innovations.

Use: Design of implementation strategies - Organizational change stage theory provided a framework for identifying the processes and strategies to support the child care industry to adopt practices that align with government food and nutrition policy (problem definition, initiation of action, implementation of change, and institutionalization of change); Implementation steps - The steps taken to involve key sectors and facilitate implementation was consistent with the processes of intersectoral action described by Harris; Explain outcomes - Diffusion of innovation was used to explain adoption.

Limitations and recommendations: -

INSPECT: Org stage theory – 2:3:3

DoI – 2:2:3

Harris – 1:2:1

Study 14: Markides, Crixell, Thompson & Biediger-Friedman, 2017.

Design: Pre- and post-quasi-experimental.

Location: San Marcos, Texas, USA.

Setting: Childcare centres.

Objectives: The objective of this study was to measure the efficacy of a child care centre staff educational workshop in improving child care centre menus (Best Food FITS).

Intervention: Best Food FITS.

Implementation strategies: Assessment of the nutrition and physical activity environment of the centre; a workshop for child care centre directors and staff; setting goals for improvement;

Population: Centres directors and staff.

Measured Outcomes: Menu nutritional quality (food groups).

Theoretical approach used:

Social Cognitive Theory

Utility: Social Cognitive Theory, aimed to improve learning and elicit behavioral change.

Use: Design implementation strategies - Informed workshop content.

Limitations and recommendations: not possible to detect whether other factors, such as time of year, affected menu content (no control). The success of the intervention might be explained because the workshop was professional and interactive – inviting personal reflection.
INSPECT: SCT – 2:2:2

Study 15: Farmer, Nikolopoulos, McCargar, Berry & Mager, 2015. Nikolopoulos, Farmer, Berry, McCargar & Mager, 2015.
Design: Case study
Location: Alberta, Canada.
Setting: Daycare centres.
Objectives: The objective of this study was to explore child care providers' perceptions and attitudes about Alberta Nutrition Guidelines for Children and Youth characteristics and how this may have influenced early adoption of the ANGCY and (2) gain an in-depth understanding of the organizational characteristics and processes that may influence the adoption and implementation of the ANGCY.
Intervention: Alberta Nutrition Guidelines for Children and Youth.
Implementation strategies: Printed copies, workshops, support not uniformly distributed, and not part of the study.
Population: Director, cook, junior, and senior childcare staff.
Measured Outcomes: centralization, complexity, formalization, leadership, network and knowledge broker, organizational culture, health champions, relative advantage, compatibility, complexity, trialability, and observability.
Theoretical approach used:
Diffusion of Innovations (DoI)
Utility: Diffusion of Innovations provides a framework for understanding the process of adoption in organizations by explaining how, why and at what rate innovations are adopted, taking into consideration the context in which this occurs.
Use: Identify factors - Key constructs from the DoI framework were used to develop the interview protocol based and guided the evaluation and analysis of the results.
Limitations and recommendations: Future research should tailor evaluations specific to the characteristics of the guidelines, including non-adopters and centres in multiple settings.
INSPECT: DoI – 3:3:3

Study 16: Clark, Anderson, Adams, Baker, & Barrett, 2009.

Design: Pre- and post-quasi-experimental.

Location: Colorado, US.

Setting: Licensed childcare centres.

Objectives: To determine changes in child care providers' knowledge of and attitudes and behaviours toward infant feeding best practices after viewing the InfaNET Nutrition for Child Care Providers Website.

Intervention: InfaNET Nutrition for Child Care Providers Web site and incentives

Implementation strategies: Dissemination of website.

Population: Childcare providers.

Measured Outcomes: Knowledge, attitudes, and behaviours.

Theoretical approach used:

Social Cognitive Theory/Social learning (SCT/SLT)

Utility: SLT was used because of the essential constructs of interaction with the person, behaviour, and environment (reciprocal determinism), self-efficacy, and modelling.

Use: Design implementation strategy **-** The Social Learning Theory was used as the theoretical framework for the development of the Web site.

Limitations and recommendations: More research is needed to say if the website is linked to sustained attitudes and behaviours.

INSPECT – SCT/Social learning: 2:2:2

Study 17: Camp, 2008.

Design: Sequential exploratory.

Location: Texas, USA.

Setting: Childcare centres.

Objectives: Determine the effects of state regulations on (1) provision of food to preschool children; (2) perceived nutritional content of preschool meals; (3) allocation of resources within the centre; (4) tuition; and (5) care of children.

Intervention: State regulations.

Implementation strategy: Not applicable.

Population: Directors of child care centres or their designates.

Measured Outcomes: Environment, situation, outcome expectations and expectancies, self-efficacy, collective efficacy, self-control, and reinforcements.

Theoretical approach used:
Social Cognitive Theory (SCT)
Utility: Social learning explains how the environment, individuals and groups, and behaviour interact.
Use: Identify factors- Data from the qualitative interviews were used to develop recommendations for survey items for a quantitative questionnaire using Social Cognitive Theory as a framework.
Limitations and recommendations: Construct of collective efficacy should be addressed in further research; Further research needs to understand the mechanisms by which state and local regulations inform the food policies of child care centres; and explore how regulations impact centres, how centres adapt to conflicting regulations, and which regulations take priority for the centres.
INSPECT – SCT: 2:3:3

Study 18: Dunn, Thomas, Ward, Webber, Cullitan, Pegram, & Webber, 2006.
Design: Post-intervention survey.
Location: North Carolina, USA.
Setting: Childcare centres.
Objectives: Describe the development and initial implementation of Colour Me Healthy, healthy eating and physical activity program for children.
Intervention: Colour me healthy.
Implementation strategies: Train, the trainer model; Workshop and resources; hands-on experiential methods were used during the training.
Population: Childcare and day home providers.
Measured Outcomes: Effectiveness of the training and resources provided and an increase in children's knowledge and behaviours (reported by providers).
Theoretical approach used:
Social cognitive theory (SCT)
Utility: Social cognitive theory explains the way people acquire and maintain their behaviour and provides the basis for intervention strategies;
Use: Design implementation strategy - Social cognitive theory and the socioecological model were used to guide program development.

Limitations and recommendations: A partnership between agencies at the state and county levels provide a rich infrastructure for the dissemination and implementation of programs. Providing training was essential for implementation.
INSPECT – SCT: 2:2:2

Study 19: Marks, Barnett, Foulkes, Hawe, & Allender, 2013.
Design: Cross-sectional survey.
Location: Australia.
Setting: Long day-care centres (LDC).
Objectives: Determine the feasibility and relevance of Social Network Analysis for child obesity prevention amongst staff within a long daycare setting.
Intervention: Obesity prevention programs.
Implementation strategy: Not applicable.
Population: Practitioners who were already aware of and highly sensitized to the opportunities to address obesity in long daycare.
Measured Outcomes: Frequency and value of general information exchange, physical activity information provision, and consultation; dietary information provision; decision-making and consultation; network sources of policy information; Density and centralization measures.
Theoretical approach used:
Social Network Analysis (SNA)
Utility: SNA represents a potentially valuable tool for understanding LDC network structures and identifying important players for tailoring intervention planning and building team capacity relevant to each LDC context.
Use: Identify factors - Social network questionnaire was designed to articulate and quantify relationships between staff that could influence practice; diagrams were presented for selected results to provide a visual representation to aid description and analysis.
Limitations recommendations: Explore the extent that external networks influence sharing of skills between centres; Investigate the impact of networks on the environment; Role of prior interventions in creating additional external networks.
INSPECT – SNA: 3:3:3

Study 20: Yoong, et al., 2015.
Design: Cross-sectional survey design.

Location: New South Wales, Australia.
Setting: Childcare centres, including preschools and long day care centres.
Objectives: (1) identify centres' access to the Web and Web-access devices, and (2) identify factors associated with managers' intention to use a Web-based program designed to support the implementation of healthy eating and PA activity-promoting policies and practices
Intervention: Web-based program (not implemented).
Implementation strategy: Dissemination of website.
Population: Childcare centres managers and alternative staff.
Measured Outcomes: Access and use of the internet, factors associated with intention to use (ease of use and usefulness); features to support policy and implementation.
Theoretical approach used:
Technology Acceptance Model (TAM)
Utility: TAM is one of the most parsimonious models assessing end-user intentions to adopt a new information technology system; TAM may be a useful model to inform the design, implementation, and evaluation of electronic Web-based programs in childcare centres.
Use: Identify factors - Items from the Technology Acceptance Model were used to assess the intention to use the hypothetical electronic Web-based program**.**
Limitations recommendations: Assessed intention to use, rather than the actual use of electronic and conducted with service managers only. An opportunity exists to use more interactive training resources and decision-support tools; Further examination of characteristics associated with ease oh use and perceived usefulness; Integration of strategies to increase usefulness; Examine perceived usefulness/ease with actual use; Include staff responsible for delivering the intervention, not only managers.
INSPECT – TAM: 3:3:3

Study 21: Lanigan, 2012.
Design: Longitudinal design using survey and observation data.
Location: USA.
Setting: Early learning and care settings.
Objectives: To examine the association between childcare practices and childcare provider knowledge and beliefs about their role in supporting children's healthful eating.

Intervention: Encouraging Healthy Activity and Eating in Childcare Environments (ENHANCE).

Implementation strategies: The ENHANCE project used a collaborative, nonprescriptive approach to support sites in identifying and implementing changes that promoted healthful child weight (social networking, support with action plans, training and funding).

Population: Childcare professionals in both lead and assistant roles.

Measured Outcomes: Child care setting variables included the feeding environment, nutrition education, and family communication. Childcare provider variables were efficacy, knowledge, and misconceptions about child feeding; and the priority placed on supporting children's healthful eating.

Theoretical approach used:

Health Belief Model (HBM)

Transtheoretical model of change

Utility: HBM suggests they would change if their failure could be damaging, that they could make a difference and they were given training and tools to change; Transtheoretical model suggests that childcare providers require different kinds of support to move them along the change.

Use: Design implementation strategies - The Health Belief Model and the Transtheoretical Model guided the development and refinement of the ENHANCE intervention.

Limitations recommendations: As part of the implementation process, provider beliefs related to children's healthful eating and feeding practices should be assessed to design training that not only introduces the initiative or curriculum but addresses provider misconceptions and promotes their sense of efficacy.

INSPECT – HBM: 2:2:2

Transtheoretical model:2:2:2

Study 22: Lynch, 2015. Lynch, 2015b; Lynch & Batal, 2011. Lynch & Batal 2012.

Design: Qualitative research approach is rooted in a constructionist epistemology.

Location: Ontario, Canada.

Setting: Kindergarten.

Objectives: To develop a draft of SNAK, a play-based kindergarten nutrition education program.

Intervention: Nutrition education program.

Implementation strategies: Not applicable.
Population: Canadian kindergarten teachers.
Measured Outcomes: Providers teaching strategies and ways to teach healthy eating.
Theoretical approach used:
Social Cognitive Theory (SCT)
Diffusion of Innovations
Utility: SCT is one of the most successful health behaviour change theories, is popular with traditional school-based nutrition programs, particularly with school-based interventions focusing on dietary behaviour change; DoI is useful when understanding how to implement a program in an organization.
Use: Design implementation strategies - SCT and Diffusion of Innovations (DI), were used together to develop the core components of SNAK and anticipate issues that may arise during SNAK's implementation in kindergartens.
Limitations recommendations: A limitation of using SCT involves measuring changes in constructs, such as improvements in self-efficacy. Additionally, by building a program based on SCT, there is risk in focusing only on individual-level determinants, which is why research using theories such as SCT. Future research to develop strategies to support teachers and examine actual implementation, and how parental pressures and an academic teaching climate influence implementation.
INSPECT – SCT: 3:3:3
DoI: 3:3:3

Study 23: Natale, Camejo & Sanders, 2016.
Design: Pre and post.
Location: Miami-Dade County in Florida, USA.
Setting: Childcare centres (out-of-home facilities) and family childcare homes (in-home facilities).
Objectives: Evaluate the effectiveness of a childcare facility-based obesity prevention program.
Intervention: Impact of the availability of healthy foods and beverages in addition to increasing physical activity.
Implementation strategies: Provision of policy changes, consultations with experts and technical assistance;
Population: Childcare providers.

Measured Outcomes: Physical activity elf-assessment; Food Frequency Questionnaire; Health Environment Rating Scale; provider's knowledge and self-efficacy.

Theoretical approach used:

Social cognitive theory (SCT)

Utility: Children learn new behaviours by observing and imitating models.

Use: Design implementation strategies - Underpinnings selected expectancies (the values and benefits placed on a particular outcome), self-control and performance (decisions made to achieve self-control), behaviour capability/knowledge/skills acquisition to perform that behaviour, environment, and situation (actual and perceived), observational learning, and self-efficacy for specific behaviours.

Limitations and recommendations: It is important to understand the interplay between cultural and environmental factors that can affect program outcomes to effectively address obesity prevention in preschool. Access to foods and Ethnic disparities and possible barriers to intervention when promoting policy change in child care facilities.

INSPECT – SCT: 2:3:3

Study 24: Mikkelsen, 2011

Design: Descriptive.

Location: Denmark.

Setting: Kindergartens.

Objectives: To give a brief account of the value of the policy as a tool that can be used at the local level to guide action towards desired purposes to promote a healthy lifestyle in kindergartens; Proposed a proposed stepwise approach includes a continuous improvement aspect.

Intervention: Health eating and Physical Activity policies.

Implementation strategies: Not applicable.

Population: Not applicable.

Measured outcomes: Not applicable.

Theoretical approach used:

Plan, Do, Check Act (PDCA) cycle

Utility: Manage organizational tasks continuously.

Use: Recommendations - The approach proposed is in line with the organizational framework that often refers to the Plan, Do, Check Act (PDCA) cycle.

Limitations and recommendations: Kindergartens are to take a more reflective and active role in policy implementation, keeping in mind kindergarten goals and support available**.**

INSPECT – PDCA: 1:2:1

Study 25: Mayfield & Graves, 2014.

Design: Pre- and post-assessment.

Location: USA.

Setting: Childcare centre.

Objectives: Develop and evaluate the impact of the RECIPE.

Intervention: RECIPE for Growing Healthy Children program was developed to educate childcare staff in creating an environment that promotes quality meals and snacks, nutrition education, and positive role modelling to support lifelong healthy beliefs and behaviours.

Implementation strategies: Workbooks, video clips and training.

Population: Centre directors and foodservice staff.

Measured Outcomes: Changes in knowledge, attitudes, and reported behaviour, child BMI and consumption.

Theoretical approach used:

Learning by Dialogue

Utility/Use: Design implementation strategies - Dialogue learning, as an approach to Adult Learning Theory, allows participants to share barriers and opportunities to creating healthier and more varied menus.

Limitations and recommendations: None mentioned.

INSPECT – Learning by Dialogue 2:2:2

Study 26: Smith, 2005.

Design: Pre- and post-quasi-experimental.

Location: Louisiana, USA.

Setting: Daycare centres participating in CACFP.

Objectives: Evaluate sanitary violations; Investigate sanitary practices; Develop a Manual to minimize risks.

Intervention: A training manual.

Implementation strategies: Workshops.

Population: Day care directors.

Measured Outcomes: Sanitation practices.
Theoretical approach used:
Adult learning
Utility: Learning process can be enhanced by the use of learning theories.
Use: Design implementation strategies - Mention strategies related to cognitive and behavioural (social) learning approaches; Methods of communication the information was based on an employee's ability to assimilate (use of adult learning theories and concise, original, and logical sequence for printed materials).
Limitations and recommendations: Did not evaluate the manual in real-life situations.
INSPECT – Adult learning: 2:2:3

Study 27: Sharma, Upadhyaya, Schober & Byrd-Williams, 2014.
Design: Qualitative study.
Location: Houston, TexasM USA.
Setting: Early Childhood Education Settings (Mention indirectly program and implementation planners).
Intervention type: Nutrition and physical activities programs.
Implementation strategies: Not applicable.
Theoretical approach used: Develop own framework.
Utility: Lays the groundwork for developing measures to assess readiness; readiness must be assessed as a part of program implementation and evaluation plan.
Use: Not applicable.
Development process: Reviewed the scientific literature in multiple sectors, and validated our framework through data collected in focus groups conducted among educators' and centre staff members. The conceptual framework was validated by conducting 3 focus groups comprising 18 educators centre management staff members (16 directors and 2 assistant directors). For this research, a consensus was established when the constructs emerged consistently in all focus groups and more than 90% of the participants concurred.
Elements: Three main antecedents for readiness that are linked to the successful implementation of a new program: structural and external factors, staff attributes, and other psychological factors. The structural and external factors are operationalized at the organizational level only, whereas staff attributes and other psychological factors are attitudinal constructs operationalized at both the organizational level and the individual level. Organizational factors also influence individual factors, and all these factors are

theorized to collectively inform organizational readiness, which in turn influences program implementation

Limitations: None presented.

Recommendations: Timing should be considered when using the framework. If the is to predict the success of implementation, readiness should be is assessed after the decision to adopt the change occurs but before the implementation process begins. If the objective is to do a screening to inform and optimize recruitment, then the assessment should take place before the decision to adopt the change occurs

MOULLIN: 3:3

Study 28 Briley, Roberts-Gray & Simpson, 1994.

Design: Qualitative approach.

Location: Texas, USA.

Setting: Child care centre.

Objective: Identification of factors that influence the menu at childcare centres.

Intervention: CAFCP menu requirements

Implementation strategy: not applicable

Utility: Data and theory developed in this study support recommendations regarding strategies for improving and extending food and nutrition training for child care personnel; adjustments in the way that program assistance and monitoring is provided; and policy studies and strategies.

Use: Not applicable.

Development process: Grounded theory approach; nine centres from three ethnic communities were interviewed. Documents, interviews, and observations were collected on two consecutive days.

Elements: Only factors that should be considered when making decisions about training and assistance: mission, culture, convenience, staff knowledge, staff perceptions, history, cost, requirements.

Limitations: None mentioned.

Recommendations: Training should be sensitive to the child, mission and culture, and address problems frequently observed.

MOULLIN: 3:2

Study 29: Carraway-Stage, Henson, Dipper, Spangler, Ash, & Goodell, 2014.

Design: Qualitative approach.

Location: North Carolina, USA.
Setting: Head Start centres.
Objective: Understanding the state of nutrition education in the head start classroom.
Intervention: Nutrition education in the classroom (align with head start standards).
Implementation strategy: Not applicable.
Utility: Provides a useful framework for exploring the major factors that impact preschool teachers' ability to teach nutrition in their classrooms;) to use the framework as a way to begin a conversation concerning how these factors impact nutrition education within their organizations; help to improve communication between administrators and teachers; consider the proposed framework more generally to help them develop supportive, clear policies for nutrition instruction in the preschool environment.
Use: Not applicable.
Development process: Phenomenological approach + grounded theory; In-depth interview with 31 health/nutrition coordinators, 11 centre directors, 32 teachers"
Elements: (1) Describe causal conditions (perception and teacher background), strategies used by teachers (nut education methods), consequences (quality of education provided), and intervening conditions (resources, policies, and regulations, nutrition focus - priority, classroom constrains - time. (2) Include elements related to teacher perception of policy and regulations.
Limitations: Convenience sample (may have a preexisting interest in the subject, telephone-based (less feeling or revealing fewer experiences) and must be tested with other content areas.
Recommendations: use the framework to support supportive policy development, and begin a conversation about factors that affect practice.
MOULLIN: 3:2

Study 30: Otten, Hirsch & Lim, 2017.
Design: Qualitative approach.
Location: Seattle, USA.
Setting: Child care centre.
Objective: Explore factors influencing the food purchases of early care and education providers.
Intervention: Food purchases and menu planning based on CAFCP standards.
Implementation strategies: Not applicable.

Utility: Identifies potential pathways of intervention and outcome; system-based understanding and approach—one that accounts for an array of influencers and their interactions—is necessary to take advantage of important opportunities and address barriers to improving child-care nutrition.
Use: Not applicable
Development process: Semi-structured interviews were done with 16 unique participants: (directors) purposefully selected
Elements: Macro-level environments (i.e., regulations; suppliers and vendors, including stores); physical environment and settings (i.e., organizational mission, budget, and structure; the facility itself); social environments (i.e., professional networks; peers; the site-specific family community); and individual factors at both provider- and child levels (i.e., providers' skills, behaviours, motivations, attitudes, knowledge, and values; child food preferences; and child allergies).
Limitations: Research should focus on teasing out the most influential factors via applying more quantitative methodologies.
Recommendations: A system-based approach is necessary to address barriers to improve childcare nutrition**.**
INSPECT: 3:3

Study 31: Williams, 2016.
Design: Quasi-experimental design.
Location: Southeastern USA.
Setting: Childcare facilities.
Objectives: Determine if there are significant differences in the calories and nutritional value of lunch meals offered in facilities that participate in CACFP and in facilities that do not participate in CACFP.
Intervention: CACFP program.
Implementation strategy: Not part of the study, but CACFP providers might receive training on CACFO standards.
Population: Sample of menus.
Measured outcomes: Menu components were entered into an Excel spreadsheet with columns for the levels of the independent variables: calories, carbohydrates, fats, and proteins, and for CACFP participation or lack of participation
Theoretical approach used:

Theory of planned behaviour

Utility: The theory of planned behaviour proposed two justifications to explain human behaviour.

Use: Explain results - The theory of planned behaviour provided the theoretical foundation for the study. It was perceived that CACFP centres would more likely to have better menus as participation in the program would affect positive social pressure and perceived behaviour control, factors related to motivation for new behaviour.

Limitations and recommendations Additional research over a longer duration than a single month, so that seasonal differences in food choices could be examined. Delve deeper into the CACFP, with rules that are stricter than state guidelines, and how child care facility directors who participate in the CACFP understand these rules differences.

INSPECT: (2:2:2)

Study 32: Calloway, Stern, Schober & Yaroch, 2017.

Design: Qualitative study.

Location: AZ, FL, IN, KS, MO, and NJ, in USA.

Setting: ECE programs that participated in the Nemours National Early Care and Education Learning Collaborative (ECELC) Project (The Nemours Foundation 2016).

Objectives: To understand the process by which early childhood education (ECE) providers effectively used an existing intervention to facilitate the creation or strengthening of a written breastfeeding policy, understand the factors important to this process, and present a logic model to guide future intervention design and evaluation.

Intervention: Breastfeeding Policies.

Implementation strategies: The ECELC involves periodic (monthly and bi-monthly), in-person learning sessions in which ECE providers receive education, skill-building, action planning guidance, reactive and proactive technical assistance, and peer-to-peer knowledge sharing and network building.

Population: Program representatives (directors or senior staff).

Theoretical approach used: Develop own “logic model” - how an intervention can support an early childhood education (ECE) program to create a written breastfeeding (BF) policy, and the expected measurable outputs and outcomes from those activities.

Utility: Guide future intervention design and evaluation.

Use: Not applicable.

Development process: Interview guide included questions pertaining to four areas of ECE breastfeeding best practices: creating a breastfeeding space or room; conducting regular staff training on breastfeeding; promoting breastfeeding through parent outreach; and creating a written breastfeeding policy. The interviews prompted providers to discuss current breastfeeding environments and policies; the process for creating change in policy, environment, or practices; and motivations, barriers, and facilitators for creating change.
Elements: Based on the results of this study, that ECE programs needed to be motivated to change, educated on breastfeeding (e.g., best practices), provided with resources (e.g., sample policies), provided with technical assistance, and involved in peer-to-peer knowledge sharing. Additionally, these activities must take place under the constraints of perceived parental indifference, limited staff time, and varying base levels of content knowledge and experience time, and varying base levels of content knowledge and experience. Interventions that account for these facilitators, while mitigating the constraints, may be successful in assisting ECE programs to create their written breastfeeding policy. Desired outputs from ECE program activities include a comprehensive written breastfeeding policy, and a plan for dissemination, implementation, monitoring, and enforcement of the policy. Outcomes expected to follow these outputs include short-term outcomes, such as awareness of the policy and consistency of practices; intermediate outcomes, such as psychosocial and environmental shifts at the program favoring breastfeeding; and long-term outcomes, such as the institutionalization of breastfeeding practices and increased breastfeeding rates among program families. These positive changes in breastfeeding behaviors would ultimately lead to health benefits associated with breastfeeding
Limitations and recommendations: Only senior staff included; Interventions can motivate ECE programs to create a written breastfeeding policy by communicating the importance of breastfeeding support; ECE program directors and staff may have a limited knowledge-base about breastfeeding principles; Knowledgeable, hands-on trainers are very helpful during the policy creation process; Provision of model policies and policy templates that can be easily modified could be key facilitators in the adoption of a policy; Involving staff early in the policy creation process can ensure "buy-in."; ECE programs could include parent outreach to raise awareness among parents about the program's breastfeeding policy and practices, and to promote breastfeeding in general; Corporate" ECE programs may need help on strategies to best gain administrative support to be allowed to create a new policy; A written policy can be strengthened by covering all important and achievable aspects of

breastfeeding support in an ECE program, including a plan for dissemination, implementation, monitoring, and enforcement.
MOUILLIN: (3:2)

Study 33: Seward, Wolfenden, Finch, Wiggers, Wyse, Jones, & Yoong, 2018.
Design: Randomised controlled trial.
Location: New South Wales, Australia.
Setting: Childcare services.
Objectives: Assess, relative to usual care, the effectiveness of a multi-strategy implementation intervention in improving childcare compliance with nutrition guidelines; the impact on service-level child dietary intake was also assessed.
Intervention: Nutrition guidelines.
Implementation strategies: Securing executive support, provision of staff training, provision of resources, audit, and feedback, and implementation support.
Population: Long daycare service managers and service cooks were the service personnel targeted by the intervention.
Measured outcomes: Service cook demographics and menu-planning practices, Childcare service operational characteristics, nutrition environment and menu-planning practices, theoretical domains constructs and child food group consumption, adverse effect, and intervention delivery.
Theoretical approach used:
Theoretical Domains Framework (TDF)
Utility: The framework includes fourteen-health behaviour change domains thought to play a role in the successful implementation of best practice guidelines and policies, and has been empirically validated in the childcare as settings.
Use: Identify factors and implementation strategies - TDF was used to develop a semi-structured interview, completed with a convenience sample of seven centre-based childcare service cooks, to identify factors (barriers and enablers) that influenced childcare services' implementation of nutrition guidelines. The factors identified in these interviews informed the selection and design of the implementation intervention strategies.
Limitations and recommendations: TDF scores for a number of constructs were high and skewed. Such ceiling effects may hinder the capacity of the measure to detect meaningful changes in hypothesised implementation mediators; intervention exerts its effect on improving menu planning and food provision through other pathways.

Intervention exerts its effects on improving menu planning and food provision through other pathways.
INSPECT: TDF (3:3:3)

Study 34: Wallace, Devine, & Costello, 2017.
Design: Qualitative approach.
Location: Western Australia.
Setting: Long Day Care Centres.
Objectives: This study aimed to understand the broader needs of Australian LDCC staff in relation to providing and promoting a healthy eating environment for the children in their care.
Intervention: Food and nutrition-specific website.
Implementation strategies: Not applicable.
Population: LDCCs directors, owner, teachers, coordinator, trainee and group leaders, key stakeholders, and early childhood organisations (such as Child Australia and Early Childhood Australia).
Measured outcomes: Attitudes towards healthy eating, confidence about nutrition knowledge, and participants' perceptions of the proposed website.
Theoretical approach used: The Spiral Technology Action Research (STAR) model,
Utility: The framework can be used as a project management tool to ensure methodological rigour, acknowledging the multiple levels of influence on LDCC staff and settings. It allows active participation and the deep investigation, and provide a constant reminder of the importance of community involvement.
Use: Implementation steps **-** Elements of this model were used to manage the research process as it interweaved technological design with community involvement, through a series of developmental cycles—listen, plan, do, study, act; and the first two steps; listen and plan, were at the forefront of this study phase.
Limitations and recommendations: No limitations.
INSPECT: STAR - (2:2:2)

Study 35: Cotwright, Bales, Lee, Parrott, Celestin, Olubajo, 2017.
Design: Quasi-experimental.
Location: Georgia, USA.
Setting: Childcare programs and day homes.

Objectives: Evaluate an intervention combining policy training and technical assistance for childcare teachers with a nutrition education curriculum to improve (1) the knowledge and self-efficacy of childcare teachers in implementing obesity prevention policies and practices, (2) the quantity and quality of nutrition and physical activity education, and (3) the childcare wellness environment.
Intervention: Eat Healthy, Be Active 6-week.
Implementation strategies: Teacher training and technical assistance focused on policy, systems, and environmental approaches and direct education; educational newsletters, recipes, take-home activities for families, and resources from Let's Move! Child Care.
Population: Program administrators and teachers.
Measured outcomes: Georgia Quality Rated Nutrition and Physical Activity Assessment, Confidence About Activity and Nutrition questionnaire, qualitative information about the implementation of the intervention and written summaries of weekly classroom observations from Healthy Child Care Georgia staff members.
Theoretical approach used:
Social cognitive theory (SCT)
Utility: This theory explains how a person develops behaviour patterns based on reciprocal determinism, a direct interplay among the person, the person's behaviour, and the environment
Use: Design implementation strategies - reciprocal determinism relates to how the teachers' behaviour may be influenced by individual teacher characteristics (e.g., knowledge, teaching skills) and the childcare environment; intervention aimed to improve teachers' knowledge and self-efficacy, a core construct of social cognitive theory
Limitations and recommendations: Consider contingency plans for training new teachers due to high turnover; Policy training combined with direct classroom education is a model that is well accepted by teachers.
INSPECT: SCT - (2:3:3)

Study 36: Walker, 2017.
Design: Descriptive mixed-methods.
Location: Oklahoma, USA.
Setting: Early Childhood setting.
Objectives: Identify early childhood obesity prevention stakeholders; assess current obesity prevention efforts implemented by the government, education, tribal, and private

stakeholders across Oklahoma; and conduct a network analysis to discover relationships among these stakeholders, and develop and action plan for obesity prevention.
Intervention: action plan for obesity prevention efforts.
Implementation strategies: Not applicable.
Population: ECE stakeholders.
Measured outcomes: Partnership assessment worksheet and document reviews identified partnerships and previous efforts; and action plan report;
Theoretical approach used:
CDC spectrum of opportunities
Social network analysis
Utility: The Spectrum of Opportunities lays out how states can achieve best practices and guidelines for obesity prevention using 11 different opportunities that have been successful in improving nutrition, physical activity, and screen time in ECE setting; No further comments about SNA.
Use: This SNA was created to map and measure the connections between invested parties and identify key stakeholders; Spectrum of opportunities was used to help decipher the best practices and successful methods regarding obesity prevention.
Limitations and recommendations: Develop materials that are cohesive and more easily understood by providers.
INSPECT: SNA - (2:2:3)
Spectrum (3:3:3)

Study 37: Roberts-Gray et al., 2016. Sweitzer et al., 2010. Briley et al., 2011; Sharma et al., 2015.
Design: Quasi-experimental + RCT + Case study.
Location: Texas, USA.
Setting: Licensed ECE centres.
Objectives: (1) evaluate the effectiveness of the lunch is the bag in increasing the number of vegetables and fruits packed by parents; (2) evaluate the achievement of the proximal objectives of the intervention and examine the extent to which the psychosocial variables were useful as predictors of parents packing FVWG; (3) evaluate the effectiveness of Lunch is in the Bag program on communication between parent, child, and their ECE centre providers around fruits, vegetables, and whole-grain foods; (4) evaluate factors that affect the suitability of the intervention for dissemination and implementation.

Intervention: Lunch is in the bag.
Implementation strategies: Workshops and materials to support teachers role as educators
Population: directors, staff, children, and parents.
Measured outcomes: Characteristics of the participating childcare centers and families; parent Body Mass Index (BMI), household size, parent ethnicity, household income, and parent education level; parents knowledge, outcome expectations, perceived control, subjective norms, intention, and behaviours; servings of fruit, vegetables, whole grains, refined grains, meats/beans/eggs/nuts, dairy, chips, and sweets observed in the children's parent-packed bag lunches. Completeness/fidelity, quality of implementing actions, dose-exposure and policy, and environmental context for implementing.
Theoretical approach used:
Intervention mapping approach (IMA)
Theory of Planned Behaviour – parents only
Fit or Fix - Managing the implementation of innovations/ Checking the congruence between a program and its organizational environment.
Chen- theory-driven evaluation perspective on mixed methods research
Utility: Intervention Mapping provides a framework to develop theory and evidenced-based health education programs. The Fit-or-fix model is a simple framework for anticipating and deciding how to manage the complexity of implementation. Chen's Action Model gives the intervention theory a fair chance to affect its expected outcomes.
Use: Implementation steps - Intervention Mapping guided the program adaptation; Design implementation strategies - Theory of Planned Behaviour and Social Cognitive Theory were selected to guide the activity and message development; Implementation steps and outcome indicators – the Fit-or-fix model guided the process evaluation. The Dissemination Planning Template was used to identify feasibility issues, outline the adaptability plan (e.g., tailoring materials for cultural differences), and anticipate elements of programmed support for implementation.
Limitations and recommendations: Not possible to evaluate relative contributions of components targeted to the individual, interpersonal, and organizational levels; Behaviourally based nutrition knowledge creates a solid foundation for a good program; Strategies that develop peer and organizational support and provide opportunities to practice new behaviours also are important; Embracing the idea of designing with the user in mind.

INSPECT: SCT and Theory of planned behaviour – parents only

Intervention Mapping (2:2:2)

Fit-or-Fix (3:3:3)

Action Model (2:3:3)

Study 38: Farewell et al., 2018.

Design: Quasi-experimental mixed methods.

Location: Oklahoma, USA.

Setting: Child care centres and day homes.

Objectives: Test the feasibility of training inspectors in the facilitation of the Assess. Identify. Make it Happen (AIM) strategic planning process to make health-promoting PSE changes in participating child care centers and homes and (2) test the feasibility of training inspectors to deliver HEAL messaging during routine licensing inspection visits.

Intervention: Healthy eating and active living (HEAL) behaviours and policy, system, and environment (PSE) best practice changes.

Implementation strategies: HEAL training for inspectors (hands-on demonstrations) and monthly meetings with the wellness teams at each child care centre (inspector + providers)

Population: Directors and staff.

Measured outcomes: PSE changes implemented by each wellness team; Participation Interest (e.g., What motivated you to participate in this pilot study), Project Utility (e.g., Were the intervention and related materials useful), and Perceived Project Impacts (e.g., How did this pilot study affect you and your childcare setting); total number of childcare homes and centres that were affected.

Theoretical approach used:

Assess. Identify. Make it Happen (AIM)

Utility: (AIM-P) process is a strategic planning tool that leads to the implementation of PSE changes in childcare centre environments; AIM is an iterative theoretical and evidence-based process, aligned with community-based participatory research principles and based on intervention mapping.

Use: Implementation steps - AIM-P was used to assess current best practices, identify PSE changes, and Making it happen by planning for adoption, implementation, and sustainability of PSE changes.

Limitations and recommendations: Creating HEAL webinars and professional development opportunities (including networking and information sharing) as part of ongoing trainings; developing a more flexible version of AIM-P for childcare home settings.
INSPECT: AIM-P (3:3:3)

Appendix F

Question Appraisal System (QAS-99)

1) Write or type in question number. Attach question.

Question number or question here:

Proceed through the form - Circle or highlight YES or NO for each Problem Type (1a... 8).

Whenever a YES is circled, write detailed notes on this form that describes the problem.

STEP 1 - INSTRUCTIONS: Look for problems with any introductions, instructions, or explanations from the *respondent's* point of view.	
2a. **CONFLICTING OR INACCURATE INSTRUCTIONS**, introductions, or explanations.	YES NO
2b. **COMPLICATED INSTRUCTIONS**, introductions, or explanations.	YES NO
STEP 2 - CLARITY: Identify problems related to communicating the *intent or meaning* of the question to the respondent.	
3a. **WORDING**: Question is lengthy, awkward, ungrammatical, or contains complicated syntax**.**	YES NO
3b. **TECHNICAL TERM(S)** are undefined, unclear, or complex	YES NO
3c. **VAGUE:** There are multiple ways to interpret the question or to decide what is to be included or excluded.	YES NO
3d. **REFERENCE PERIODS** are missing, not well specified, or in conflict.	YES NO
STEP 3 - ASSUMPTIONS: Determine if there are problems with assumptions made or the underlying logic.	
4a. **INAPPROPRIATE ASSUMPTIONS** are made about the respondent or about his/her living situation.	YES NO
4b. **ASSUMES CONSTANT BEHAVIOR** or experience for situations that vary.	YES NO
4c. **DOUBLE-BARRELED**: Contains more than one implicit question.	YES NO

STEP 4 - KNOWLEDGE/MEMORY: Check whether respondents are likely to *not know* or have trouble *remembering* information.	
5a. **KNOWLEDGE** may not exist: Respondent is unlikely to *know* the answer to a factual question.	YES NO
5b. **ATTITUDE** may not exist: Respondent is unlikely to have formed the attitude being asked about.	YES NO
5c. **RECALL** failure: Respondent may not *remember* the information asked for.	YES NO
5d. **COMPUTATION** problem: The question requires a difficult mental calculation.	YES NO
STEP 5 - SENSITIVITY/BIAS: Assess questions for sensitive nature or wording, and for bias.	
6a. **SENSITIVE CONTENT** (general): The question asks about a topic that is embarrassing, very private, or that involves illegal behavior.	YES NO
6b. **SENSITIVE WORDING** (specific): Given that the general topic is sensitive, the wording should be improved to minimize sensitivity.	YES NO
6c. **SOCIALLY ACCEPTABLE** response is implied by the question.	YES NO
STEP 6 - RESPONSE CATEGORIES: Assess the adequacy of the range of responses to be recorded.	
7a. **OPEN-ENDED QUESTION** that is inappropriate or difficult.	YES NO
7b. **MISMATCH** between question and response categories.	YES NO
7c. **TECHNICAL TERM(S)** are undefined, unclear, or complex.	YES NO
7d. **VAGUE** response categories are subject to multiple interpretations.	YES NO
7e. **OVERLAPPING** response categories.	YES NO
7f. **MISSING** eligible responses in response categories.	YES NO
7g. **ILLOGICAL ORDER** of response categories.	YES NO
STEP 7 - OTHER PROBLEMS: Look for problems not identified in Steps 1 - 7.	
8. Other problems not previously identified.	YES NO

Appendix G

Recruitment Letter – Direct to Child Care Centres

Child care director or owner:

Can we ask you something?

We'd like to know more about the nutrition policies and practices at your centre.

We realize you might be too busy, but your responses will help us to create resources to support you better.

Many childcare centres already participated!

Takes 15 min

Get a 10$ gift card

Until June 7th, 2019.

This study was approved by University of Alberta Research Ethics Board. Registration number: Pro00081965

For more information, please reach:

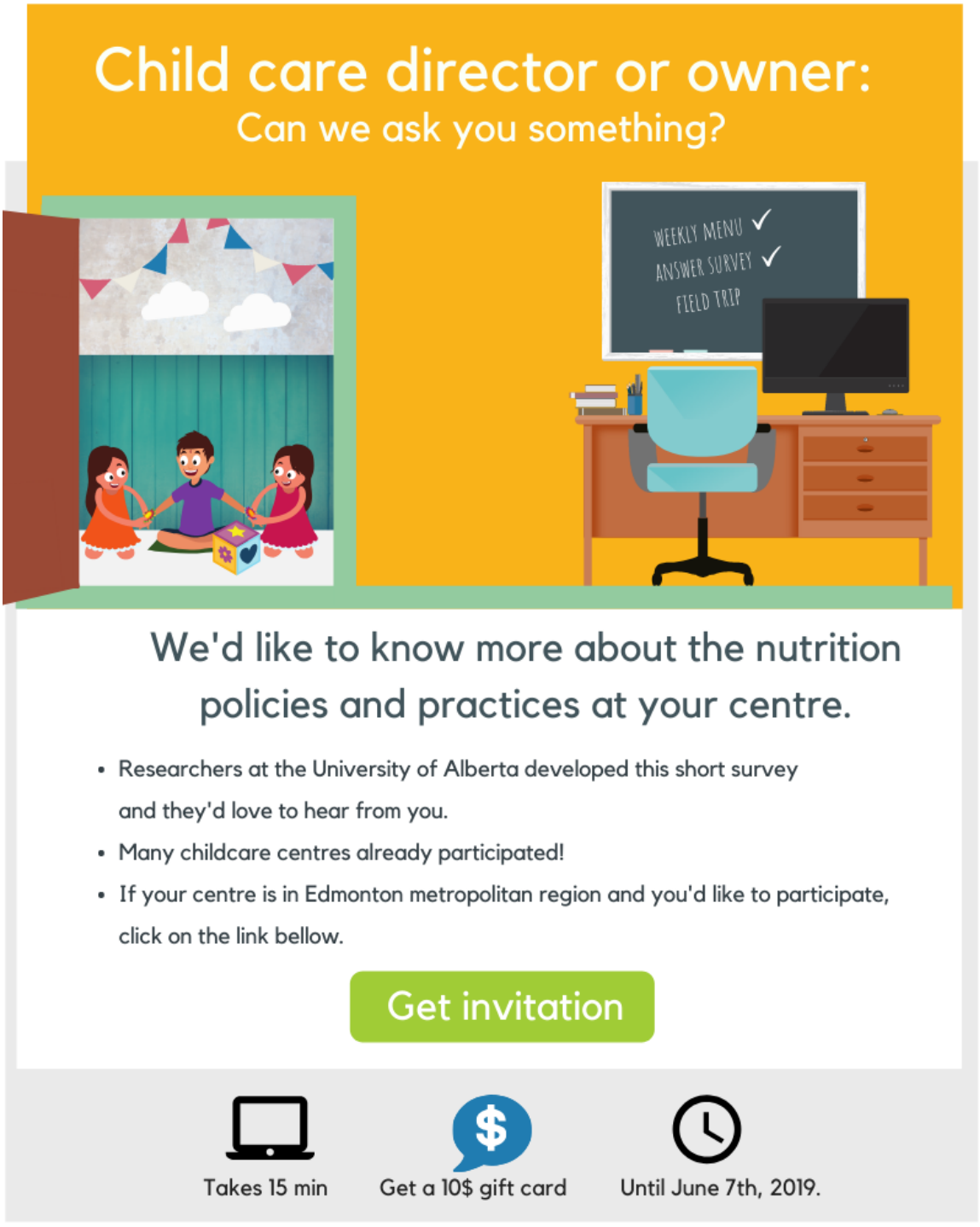
Marjorie Lima do Vale, MSc.
Email: marjorievale@ualberta.ca

Research team:

Anna Farmer, PhD, Lynn Lafave, PhD,
Rebecca Gokiert, PhD, Geoff Ball, PhD,
Katerina Maximova, PhD

Appendix H

Recruitment Letter – Province-wide dissemination



Appendix I

Consent Form

Project: "Child care centers implementation survey."

Investigators:

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Background and purpose

We will do web-based surveys with child care supervisors, managers, directors or owners across Edmonton metropolitan region.

We will explore child care centres food and nutrition policies and practices, and awareness and use of the Alberta Nutritional Guidelines for Children and Youth.

Study Procedures

We will invite you to answer two online surveys. The first survey is about your child care centres food and nutrition policies, and awareness and use of the Alberta Nutritional Guidelines for Children and Youth. It would take 10 to15 minutes to complete.

The second survey is about your child care centres food and nutrition practices. It would take 10 to 15 minutes to complete.

You will have until September 30th to submit your responses.

Benefits

We will give you the chance to self-assess your child care centres practices. You will be able to check if they follow the guidelines.

This information will update what we know about child care centres use of the guidelines. This update will inform local stakeholders on how to better support child care centres in their efforts.

Cost

There are no costs related to your participation in this study.

Risk

The surveys will focus on your child care centre. No personal information will be collected. There will be minimal risk associated with your participation. You can choose to skip any questions that make you uncomfortable.

Voluntary Participation

Your participation is voluntary. You are free to refuse to answer any question(s). You can drop out of the study at any time. There is no penalty for not participating, or for dropping out. If you feel like you don't want to participate anymore, you just need to close your internet browser. If you close your internet browser before clicking on "submit" your answers, your data will be automatically withdrawn from the study. If you want to withdraw your data after clicking on the "submit" button, please contact marjorievale@ualberta.ca within 2 weeks of completing your survey.

As a token of our appreciation for your participation, if desired, you can receive a 10$ gift card.

Confidentiality & Anonymity

All of the information collected will be used only for research. The information will remain confidential. We will store the data in password-protected computers at the University of Alberta. Only the research staff will have access to it. We will store the data for five years post-publication. After 5 years we will destroy the data.

Further Information

If you have any further questions, please do not hesitate to contact Marjorie Lima do Vale at (780) 492 9487). You can also contact Dr. Anna Farmer at (780) 492-2693.
"The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office at (780) 492-2615.

Appendix J

Survey Instrument

Please, download the information letter and read it carefully.

Do you voluntarily agree to be a participant in this study as described above?

- ☐ I agree
- ☐ I do not agree

Before we continue, we need to know if your centre met our eligibility criteria.

- ☐ Snacks and meals
- ☐ Only snacks
- ☐ Only meals
- ☐ Do not provide any food

This survey is the first part of a broad study.

It will help us to describe where child care centres are in terms of food and nutrition policies and practices.

In the second part, a few child care centres will be selected for follow-up interviews. The selection will be based on the responses you provide to this survey. There will be no costs in participating.

To participate, your child care must have a minimum of:

1 director/owner; 4 child care educators; 1 cook

The approximate time required for each participant will be 30 - 45 min.

Incentives:

Child care centre (100$ gift card/total)

Directors/owners, cooks, and educators (25$ gift card/each)

Would you like to be considered to participate in the second part?

- ☐ Yes, I am interested
- ☐ No, I am not interested

Part 1

The next questions are about your child care centre food and nutrition policy. Before completing the survey, read carefully the following definition.

Food and nutrition policy is a set of written specific rules, procedures, or practices in your child care to help provide and promote healthy food choices and healthy attitudes about food. Your child care food and nutrition policy should be based on provincial or national regulations and guidelines.

1. Does your child care centre have a written food and nutrition policy?
   - ☐ Yes
   - ☐ No

2. In the last 12 months, has your child care centre's food and nutrition policy been changed or updated?
   - ☐ Yes
   - ☐ No
   - ☐ I don't know

3. Which of the following themes are addressed in your centre current food and nutrition policy? (please, mark all that apply)

   - ☐ Definition of a healthy food
   - ☐ Food variety
   - ☐ Portion sizes
   - ☐ Availability of, and access to safe, nutritious foods
   - ☐ Supportive environments for healthy eating (space, time, layout)
   - ☐ Adult modeling of healthy eating
   - ☐ Food safety
   - ☐ Fundraising
   - ☐ Other: _____
   - ☐ I don't know

4. Who was involved in developing or writing your child care centre's food and nutrition policy? (please, mark all that apply)
   - ☐ Parents
   - ☐ Children
   - ☐ Daycare centre administrators
   - ☐ Daycare providers
   - ☐ Community dietitians
   - ☐ School health nurse or community health nurse
   - ☐ Health promotion/wellness co-ordinators
   - ☐ Dental health staff
   - ☐ I don't know
   - ☐ Other: _____
   - ☐ I don't know

Part 2

The next questions are about your child care centre's food and nutrition policy. Read the items below and select the option that best describes your opinion.

	No	Somewhat	Yes	I don't know
1.My child care centre's food and nutrition policy…				
Include goals and objectives				
Is readily available to staff				
Became a part of the day to day practice at our child care centre				

The next questions are about any plan, procedures, and timelines put in place in your child care centre to implement your food and nutrition policy. Read the items below and select the option that best describes your opinion.

2. My child care centre…	No	Somewhat	Yes	I don't know
Has established plans or procedures for implementing our food and nutrition policy				
Has a written schedule for implementing our food and nutrition policy				
Has a description of staff responsibilities when it comes to implementing our food and nutrition policy				
Has modified available best practice recommendations in your nutrition policy to meet the needs of our child care				
Has the required infrastructure (for example, resources and equipment) for implementing our food and nutrition policy				
Has assigned responsibilities to staff when it comes to the implementation of our food and nutrition policy				

Has assigned supervisors to coordinate the implementation of our food and nutrition policy				
Has set aside human resources (people) to continue the implementation of our food and nutrition policy				
Has set aside financial resources (money) to continue the implementation of our food and nutrition policy				
Has set aside resources to ensure training for staff to continue the implementation of our food and nutrition policy				
Has set aside physical resources (space) to continue the implementation of our food and nutrition policy				

3. Which child care centre staff are responsible for implementation of your child care centre's food and nutrition policy? (Please, mark all that apply)

- ☐ Child care educators
- ☐ Cooks
- ☐ Child care directors
- ☐ Child care managers
- ☐ Child care owners
- ☐ Other
- ☐ I don't know

The next questions are about the involvement of child care providers in the implementation of your child care centre's food and nutrition policy. Read the items below and select the option that best describes your opinion.

4. Have child care ...	**No**	**Somewhat**	**Yes**	**I don't know**
Staff, other than those responsible for implementing the food and nutrition policy, also contributed to the implementation of your child care centre's food and nutrition policy?				
Directors and/or managers actively encouraged the implementation of your child care centre's food and nutrition policy?				

The next questions are about any evaluation of the implementation of your child care centre's food and nutrition policy. Read the items below and select the option that best describes your opinion.

5. My child care centre ...	**No**	**Somewhat**	**Yes**	**I don't know**
Has evaluated the implementation of our food and nutrition policy				
Has written evaluation reports of the implementation of our food and nutrition policy				

Part 3

This is the final session. The next questions are your demographic characteristics. And also about your child care centre characteristics.

1. Which option best describe your main role in your child care centre?
   - ☐ Director or manager
   - ☐ Owner
   - ☐ Operator
   - ☐ Other
2. How many years of administrative experience in child care centres do you have?
   - ☐ Less than 1 year
   - ☐ 1 to 5 years
   - ☐ 6 to 10 years
   - ☐ 11 to 15 years
   - ☐ 16 to 20 years
   - ☐ More than 21 years
3. Do you consider yourself to be a...?
   - ☐ Male
   - ☐ Female
   - ☐ Other
   - ☐ Prefer not to say
4. Which age group do you belong to?
   - ☐ 20 to 29 years
   - ☐ 30 to 39 years
   - ☐ 40 to 49 years
   - ☐ 50 to 59 years
   - ☐ 60 or more years
5. What is your highest level of education?

- ☐ No certificate, diploma or degree
- ☐ High school diploma or equivalency certificate
- ☐ College, CEGEP or other non-university certificate or diploma
- ☐ University certificate or diploma below bachelor level
- ☐ Bachelor's degree
- ☐ University certificate or diploma
- ☐ Master's degree
- ☐ Earned doctorate
- ☐ Other
- ☐ If other, please specify.

6. For how many years has your child care centre been operating?
   - ☐ Less than 1 year
   - ☐ From 1 to 5 years
   - ☐ From 5 to 10 years
   - ☐ More than 10 years

7. Is your child care centre for profit or non-profit?
   - ☐ Profit
   - ☐ Non-profit

Appendix K

Information letter – Case study

WHAT YOU NEED TO KNOW BEFORE WE BEGIN

Child care Implementation Study - Part 2

2018

1 YOU ANSWERED OUR ONLINE SURVEY

And from your responses, we identified that your child care centre has a Food and Nutrition Policy in place.

2019

2 WE ARE NOW CONTACTING CENTRES FOR A FOLLOW-UP

Three child centres will be selected for the follow-up.

We are now contacting you to confirm that you are still interested.

Here is what you need to know before you make a decision.

3 WHAT'S THE PURPOSE OF THE FOLLOW-UP?

The follow-up stage is called "Case Study".

A Case Study is done when we want to understand what has been happening in your child care centre.

For this study, we are interested in knowing more about how you use your centre's Food and Nutrition Policy.

4 WHAT ARE THE NEXT STEPS FOR THIS CASE STUDY?

February

Reply to this email by March **29th** to confirm your interest in participating.

After we receive your confirmation of interest, we will contact you to book the first visit.

During the first visit.

- We will go over any questions you might have;
- Discuss and sign the consent form;
- Ask for a copy of your centre´s Food and Nutrition Policy;
- Schedule a face to face interview with the director, manager or owner.

March

Interview with directors: questions will be about developing and implementing your centre's Food and Nutrition Policy.

Should take 30 to 45 minutes.

After the we complete the interview with the director, manager or owner, we will:

- Organize the information;
- Recruit child care educators and cooks for interviews.

April

Interview with educators and cooks: questions will be about their experiences in complying with your centre's Food and Nutrition Policy.

Should take 30 to 45 minutes.

After the we complete the interview with educators and cooks, we will:

- Organize the information;
- Share with you a summary of the process of implementation of your child care centre's Food and Nutrition Policy.

WHAT'S THE COMPESATION?

100$ Visa gift card for the child care centre.

25$ Visa gift card for each participant's interview.

This study was approved by University of Alberta Research Ethics Board. Registration number: Pro00087972

Appendix L

Information letter – Recruitment participants

EDUCATORS AND COOKS NEEDED

We are recruiting participants for interviews.

YOUR CHILD CARE CENTRE IS PARTICIPATING IN A RESEARCH STUDY

We are exploring how your centre´s Food and Nutrition Policy is being used.

WE ARE INTERVIEWING DIRECTORS, EDUCATORS AND COOKS

We believe that we can only have a full picture of how the centre's Food and Nutrition Policy is being used if everyone in your childcare centre participates.

IF YOU ARE INTERESTED...

Send an email to Marjorie Vale (marjorievale@ualberta.ca) confirming your interest. **The due date is March 29th.**

After we receive your confirmation of interest, we will contact you to schedule the interview.

Interviews with educators and cooks: questions will be about your perceptions and experiences in complying with your centre´s Food and Nutrition Policy.

Where? at your child care centre or at the University of Alberta.

When? April 1st to 19th.

How long? Should take 30 to 45 minutes.

WHAT´S THE COMPESATION?

25$ Visa gift card for each participant on interview.

* 10$ gift card to compensate for transportation costs when interviews are completed at the University of Alberta.

This study was approved by University of Alberta Research Ethics Board. Registration number: Pro00087972

Appendix M

Consent forms for owners or directors

Project: "Implementation of Food and Nutrition Policies (FNP) in child care centres: a case study of factors and processes"

Investigators:

Marjorie Lima do Vale, Ph.D. Candidate
Department of Agriculture, Food and Nutritional Science
University of Alberta
Email: marjorievale@ualberta.ca
Phone: (780) 893. 2308

Anna Farmer, PhD, Associate Professor
Department of Agriculture, Food and Nutritional Science
University of Alberta
Email:anna.farmer@ualberta.ca
Phone:(780) 492.2693

Why is this project being done?

- Child care centres that have Food and Nutrition Policies in place to create better food environments for children. However, not all child care centres have a Food and Nutrition Policy.
- We want to explore how your centre's Food and Nutrition Policy was developed and put into place. And how the Food and Nutrition Policy influences your centre's food and nutrition practices.
- We hope that the insights based on your experience could help other child care centres.

What do you have to do?

- The first step involves getting a copy of your centre's Food and Nutrition Policy. Other documents related to your Food and Nutrition Policy might also be requested. For example, copy of menu plans, curriculum or activities.
- The second step involves an interview. The interview will be done at your child care centre or at the University of Alberta, whichever is most convenient for you. Questions will be about your experience in putting in place your centre's Food and Nutrition Policy. If you allow, the interview will be recorded. The interview should take 30 to 45 minutes.
- If you wish, the transcriptions and preliminary interpretations can be shared with you for review.

Will I be compensated for my participation?

- Your child care centre will receive a $100 Visa gift card for participating.
- You will receive a $25 visa gift card at the conclusion of your interview.

- You might receive an extra $10 gift card to compensate for costs with transportation if this applies.

What are the benefits?

- There are no direct benefits for your participation. The insights developed from your experience may help other child care centres in putting Food and Nutrition Policies in place.

What are the risks?

- There are minimal risks in taking part in this study. The questions that will be asked are similar to questions that you would discuss in a professional meeting.
- You are allowed to skip questions that make you feel uncomfortable. You can also drop the interview at any time without any consequences.

Is my information confidential?

- Information collected will be reported as a whole for the study, not individually. No names or other identifying information will be used. If you wish, you can review the information used on reports or scientific articles.
- All information will be kept on password protected computers. All files will be encrypted. The principal investigator will be the only person with access to the information.
- This project was reviewed by the Ethics Board of the University of Alberta.

Can I withdraw from the study?

- Participation is completely voluntary. You can withdraw at any point. If you don't want your child care centre to participate anymore, you just need to communicate your wish to the principal investigator.
- If you decide to withdraw, your data cannot be removed from the project after March 14th.

If you have questions, concerns, or complaints, please contact the principal investigator.

The plan for this study has been reviewed by a Research Ethics Board at the University of Alberta. If you have questions about your rights or how research should be conducted, you can call (780) 492-2615. This office is independent of the researchers.

Consent Statement

I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to participate in the research study described above. I will receive a copy of this consent form after I sign it.

_____

Participant's Name (printed) and Signature Date

_____

Name (printed) and Signature of Person Obtaining Consent Date

_____

	Yes	No
Please, check the box that reflects your wish.		
I wish to receive a copy of my interview transcripts for verification.	☐	☐
I wish to receive a copy of the data used on any reports or scientific publications.	☐	☐

Appendix N

Consent forms for cooks and educators

Project: "Implementation of Food and Nutrition Policies (FNP) in child care centres: a case study of factors and processes"

Investigators:

Marjorie Lima do Vale, Ph.D. Candidate
Department of Agriculture, Food and Nutritional Science
University of Alberta
Email: marjorievale@ualberta.ca
Phone: (780) 893. 2308

Anna Farmer, Associate Professor
Department of Agriculture, Food and Nutritional Science
University of Alberta
Email:anna.farmer@ualberta.ca
Phone:(780) 492.2693

Why is this project being done?

- Child care centres that have Food and Nutrition Policies create better food opportunities for children. Not all child care centres in Alberta have a Food and Nutrition Policy.
- We are investigating how your centre Food and Nutrition Policy was put in place. And how that affects your job.
- We believe that your experience could help other child care centres.

What do you have to do?

- You will participate in an interview. The interview can be at your child care centre or at the University of Alberta. Questions are about your experience at the child care. If you allow, the interview will be recorded. The interview should take 30 to 45 minutes.
- If you wish, a copy of your responses can be shared with you for review.

Will I be compensated for my participation?

- You will receive a $25 visa gift card at the conclusion of your interview.
- You might receive an extra 10$ gift card to compensate for costs with transportation.

What are the benefits?

- There are no direct benefits for your participation. The results of this project may help other child care centres in putting Food and Nutrition Policies in place.

What are the risks?

- There are minimal risks. The questions that will be asked are similar to questions that you would discuss in a professional meeting.
- You are allowed to skip questions. You can also drop the interview at any time without any problem.

Is my information confidential?

- Your name will not be used anywhere. If you wish, you can review the information used on reports or scientific articles.
- Information will be kept on password protected computers. All files will be encrypted. The principal investigator will be the only person with access to the information.
- This project was reviewed by the ethics board of the University of Alberta.

Can I withdraw from the study?

- Yes. Participation is voluntary. If you don't want to continue in the study, you just need to communicate it to the principal investigator.
- If you decide to withdraw, your data cannot be removed from the project after May 10th, 2019.

If you have questions, concerns, or complaints, please contact the principal investigator.

The plan for this study has been reviewed by a Research Ethics Board at the University of Alberta. If you have questions about your rights or how research should be conducted, you can call (780) 492-2615. This office is independent of the researchers.

Consent Statement

I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to participate in the research study described above. I will receive a copy of this consent form after I sign it.

_____

Participant's Name (printed) and Signature Date

_____

Name (printed) and Signature of Person Obtaining Consent Date

_____

Please, check the box that reflects your wish.	Yes	No
I wish to receive a copy of my interview transcripts for verification.	☐	☐
I wish to receive a copy of the data used on any reports or scientific publications.	☐	☐

If yes, please provide email address:_____

Appendix O

Interview Guide for Directors and Managers

Hello, my name is Marjorie Vale.

Thank you for agreeing to participate in this study.

As you know, I'm conducting a study about the implementation of child care centres food and nutrition policies.

More precisely, I'm interested in learning how did your centre come to the decision of having a policy, how the policy was developed and how it was integrated into your child care routine.

I would like to remind you that your participation is voluntary and you do not have to participate in this interview if you don't want to. Refusing to participate will not affect your employment at this child care at all

During the interview, if I ask you a question that you don't know how to answer or that you prefer not to answer, we can skip it without any problem.

This interview will take about 30 to 45 minutes.

I see from the consent form that you have [agreed/disagreed] to be audiotaped?

[If agreed] Please feel free to request that I stop the audiotape at any time.

[If disagreed] Please note that I will not be audio taping, but I will be taking notes during our interview.

Before we begin, do you have any questions for me about the study in general?

1. Can you tell me a little bit about your experiences as a childcare (…)?
    - What experiences have you had in childcare centres, prior to this experience?
    - What kind of training you received in the past relates to the work you do as a child care (…)?
2. Now, I want to hear about your experiences working here at this childcare centre.
    - For how long have you been working here?
    - What are your tasks and roles here?
    - How is your working relationship with the educators, the cooks, and directors/managers/owners at this childcare centre?
    - How are decisions about this childcare centre functioning and regulations made? Who is included?
    - How is the performance of childcare (…) evaluated and communicated?

3. Can you tell me how does your childcare centre promote children healthy eating behaviours?

- Which activities or strategies are done at this childcare centre to promote children healthy eating behaviours?
- What sort of things influence what your centre does to promote children healthy eating behaviours? For example, what influence which food are available at your centre, how foods are provided to children, which food and nutrition activities are conducted?
- How has any training that you received in the past helped you in supporting the activities that your centre does to promote children healthy eating behaviours?

4. I'd like to ask you to run through a timeline of how was your centre Food and Nutrition Policy developed?

- How the decision of having a FNP was made? What influenced the decision? [Government regulations, professional networks, parents, etc]
- When was the FNP developed?
- Who was involved in the FNP development? How were different people involved?
- Who would you consider were key people in the development? Why?
- How was the content of your FNP determined?
- Which sources of information or people were consulted during the development of your centre FNP? [scientific information, provincial guidelines, previous experiences, etc]

5. Can you also to run through a timeline of what happened after your centre FNP was developed?

- Which concrete steps were taken to put your centre FNP to practice?
- Who were key people taking those steps? What strategies they used to put your centre FNP to practice?
- What do you think was your role in putting your centre's FNP into practice?
- How was the FNP communicated and made accessible to people that were required to follow it?
- Who is required to follow your centre FNP?
- What resources were put in place to ensure that the FNP could be followed?
- Was there any resistance or divergent opinions about the centre FNP? How it was addressed?

6. How do you know that your centre FNP is being followed?

- Which evaluation strategies or indicators are used? Who is responsible for the evaluation? What do they do? How often?

- Since its development, has your centre's FNP changed? What was changed? Why?
- Is there anything that you would change about your centre's FNP?
- Which changes were observed after your centre FNP was put in place?
- Were there any changes that were expected but not observed? Why do you think that happened?
- Which strategies are used to ensure that your centre FNP will continue to be followed? Who does that?

7. The next questions are about your centre FNP characteristics.
    - How does your centre FNP fit with your child care mission and goals?
    - How does your centre FNP fit with your values as a child care centre (…)?
    - How does the FNP diverge from what your centre was already doing?
    - Do you consider that following your centre FNP is valuable and worthwhile?
    - Do you think that what you just said reflects the opinion of all providers or do you think that some providers might have perceived it differently?
    - Do you think that all people required to follow your centre FNP are putting your centre FNP in practice?
    - Which resources are currently available to support people in following your centre FNP?
    - What aspects do you believe are still barriers in following your centre's FNP?
    - How are those barriers addressed? Who are key people responsible for addressing barriers?
8. Do you have any other comments you would like to add?
9. What advice would you give to child care centres that do not have a FNP in place?
10. Who else do you think I should speak with?

Appendix P

Interview Guide for Educators and Cooks

Hello, my name is Marjorie Vale.

Thank you for agreeing to participate in this study.

As you know, I'm conducting a study about the implementation of child care centres food and nutrition policies.

More precisely, I'm interested in learning how did your centre come to the decision of having a policy, how the policy was developed and how it was integrated into your child care routine.

I would like to remind you that your participation is voluntary and you do not have to participate in this interview if you don't want to. Refusing to participate will not affect your employment at this child care at all

During the interview, if I ask you a question that you don't know how to answer or that you prefer not to answer, we can skip it without any problem.

This interview will take about 30 to 45 minutes.

I see from the consent form that you have [agreed/disagreed] to be audio taped?

[If agreed] Please feel free to request that I stop the audiotape at any time.

[If disagreed] Please note that I will not be audio taping, but I will be taking notes during our interview.

Before we begin, do you have any questions for me about the study in general?

1. Can you tell me a little bit about your experiences as a childcare (…)?
    - What experiences have you had in childcare centres, prior to this experience?
    - What kind of training you received as a child care (…)?
2. Now, I want to hear about your experiences working here at this childcare centre.
    - For how long have you been working here?
    - What are your tasks and roles here?
    - How is your working relationship with the educators, the cooks, and directors/managers/owners at this childcare centre?
    - Do you participate in the decisions related to this childcare centre functioning and regulations? How?
    - How is your performance as childcare (..) evaluated and communicated to you?

3. Can you tell me how do you promote children healthy eating behaviours as part of the activities that you do here?

- Which activities or strategies you do to promote children healthy eating behaviours?
- What sort of things influence your decisions about the activities or strategies that you do to promote children healthy eating behaviours? For example, what influence which food you include on the menu, how you provide food to children during meals, or which food and nutrition activities you do?
- How has any training that you received in the past helped you in in the activities that you currently do to promote children healthy eating behaviours?

4.How were you involved in the development of your centre FNP?

- Have you participated in the decision of having a FNP? How?
- Who else was involved in the FNP development? How were different people involved?
- Who would you consider were key people in the development? Why?
- How was the content of your FNP determined? What was your role in this process?
- Which sources of information or people were consulted during the development of your centre FNP? [scientific information, provincial guidelines, previous experiences, etc]

5. Can you describe what happened after your centre FNP was developed?

- Which steps were taken to put your centre FNP to practice?
- Who were key people taking those steps? What strategies were used to put your centre FNP to practice?
- How was the FNP communicated and made accessible to you?
- What do you think is your role in putting your centre's FNP into practice?
- What resources were put in place to help you following your centre FNP?

6. How does managers or directors evaluate if you are following your centre FNP?

- Which evaluation strategies or indicators are used? Who is responsible for the evaluation? What do they do? How often?
- Since its development, has your centre's FNP changed? What was changed? Why?
- Is there anything that you would change about your centre's FNP?
- Which changes you observed after your centre FNP was put in place?
- Were there any changes that you expected but not observed? Why do you think that happened?

7. The next questions are about your centre FNP characteristics.

- How does your centre FNP fit with your values as a child care centre (...)?

- How does the FNP diverge from what you're already doing?
- Do you consider that following your centre FNP is valuable and worthwhile?
- Do you think that what you just said reflects the opinion of all providers?
- Do you think that all providers required to follow your centre FNP are putting effort into it?
- What aspects do you believe are barriers for you in following your centre's FNP?

11. How do you address those barriers? Who supports you? How?
12. Do you have any other comments you would like to add?
13. Who else do you think I should speak with?

Appendix Q

Codebook – Case Study

Theme	Codes	Description
External System Level	Policy drivers and priorities	National policies and priorities supporting policy development/implementation
	Incentives and mandates	Schemes or financial incentives within the system to support policy development/implementation
	Regulatory frameworks	Regulatory/licensing requirements that asks for policy development/implementation
	Environmental instability[1]	Characteristics or changes in the macroenvironment that affect policy development/implementation (e.g., staff, funding)
	Inter-organizational network and relationships	Inter-organizational networks that support policy development/implementation
Organizational and Team Level	Organizational Priorities	Strategic priorities of the organisation that support policy development/implementation
	Senior leadership and management support	Key individuals and leaders within the organization support policy development/implementation
	Culture	Providers feel actively involved/valued in policy development/implementation, and welcomed to introduce new ideas
	Structure and systems	Information and communication systems, opportunities for networking and learning across departments/teams
	History of innovation and change	History of policy change in the organization
	Absorptive capacity	Management team actively seek opportunities for improvement in policy
	Learning networks	Spaces where providers can come together to learn (e.g., policies, practices, responsibilities)
	Formal and informal leadership support	Leaders create a facilitative context through providing motivation and support, and reinforcing policy
	Mechanism for embedding change	Mechanisms in place to support embedding change (e.g., formal policies and procedures)

	Evaluation and feedback processes	Mechanisms in place to support evaluation (e.g., audit and feedback, performance monitoring)
	Learning environments	Mechanisms in place to support learning (e.g., professional development opportunities)
Recipients	Motivation	Recipients' motivation and commitment to comply with policies and practices
	Values and Beliefs	Recipients' values, beliefs and attitudes towards food and nutrition and children's health
	Goals	What providers trying to accomplish in terms of policy and food and nutrition
	Skills and knowledge	Knowledge, skills and experiences to undertake the tasks
	Time, resources and support	Resources available to support the implementation process (e.g. time and/ or financial support for new skills development, new equipment, expert support and advice)
	Local opinion leaders	Individuals who possess authority and credibility to shape and influence other colleagues.
	Collaboration and teamwork	Group processes to create a sense of engagement and build consensus
	Existing networks[3]	Peer networks and other networks
	Power and authority	Control or influence that comes from a position or role or the possession of knowledge
	Presence of boundaries	Boundaries in terms of language and terminology, interpretation, degree of novelty
Evidence	Underlying sources	Policy is viewed as rigorous and robust
	Clarity[1]	Clarity of policies and tasks
	Degree of Fit	Policy 'fit' the local setting. It is likely to be accepted or contested.
	Usability	Policy is packaged in an accessible and usable form
	Relative advantage	Policy offer advantages over the current way of doing things
	Trialability	potential to test out/pilot the introduction of the evidence/innovation on a small scale

	Observable results[1]	Extent to which the results or benefit of using the innovation are visible
	Adaptability[2]	The degree to which policies can be adapted, tailored, refined, or reinvented to meet the recipient's needs
	Complexity[2]	Perceived difficulty of the innovation

[1] Definitions not informed by PARIHS available resources

[2] Constructs not originally included in the PARIHS